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NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION TRENTON
NATIONAL DAM SAFETY PROGRAM. LOWER AETNA LAKE DAM (NJ00418), DE-ETC(U)
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DELAWARE RIVER BASIN
TRIBUTARY TO HAYNES CREEK
BURLINGTON COUNTY,
NEW JERSEY

**LOWER AETNA
LAKE DAM
NJ 00418**

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**PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM**

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.		

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15 JUL 1980

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

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Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Lower Aetna Lake Dam in Burlington County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Lower Aetna Lake Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillways are considered inadequate because a flow equivalent to five percent of the One Hundred Year Flood would cause the dam to be overtopped. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

(a) The spillways' adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Within three months of the consultant's findings, remedial measures to ensure spillway adequacy should be initiated.

(b) Within six months from the date of approval of this report, the following remedial actions should be initiated:

(1) Embankment areas behind the culvert wingwalls that have been eroded should be regraded and covered with slope protection.

(2) Remove trees on the downstream embankment to lessen the piping potential.

(3) Divert water at the crest of the downstream slope to avoid gullying. Consideration should be given to constructing an extended asphalt lip curb along the rear edge of the pavement to control the run-off.

NAPEN-N

Honorable Brendan T. Byrne

(4) Regrade, compact and seed or sod the various sloughed areas on the backslopes.

(5) Place riprap or energy attenuation material in the downstream main spillway channel to lessen the scouring of the stilling basin and the eventual undercutting of the inverts, especially at Spillway No. 1.

c. The owner should develop an emergency action plan that outlines actions to be taken by the operator in the event of an emergency at the dam and a downstream warning system within six months from the date of approval of this report.

d. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam within one year from the date of approval of this report.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Forsythe of the Sixth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Inspection Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,



JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Copies furnished:
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LOWER AETNA LAKE DAM (NJ00418)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 12 November 1979 by Louis Berger and Associates Inc. under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Lower Aetna Lake Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillways are considered inadequate because a flow equivalent to five percent of the One Hundred Year Flood would cause the dam to be overtopped. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

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(3) Divert water at the crest of the downstream slope to avoid gullyng. Consideration should be given to constructing an extended asphalt lip curb along the rear edge of the pavement to control the run-off.

(4) Regrade, compact and seed or sod the various sloughed areas on the backslopes.

(5) Place riprap or energy attenuation material in the downstream main spillway channel to lessen the scouring of the stilling basin and the eventual undercutting of the inverts, especially at Spillway No. 1.

c. The owner should develop an emergency action plan that outlines actions to be taken by the operator in the event of an emergency at the dam and a downstream warning system within six months from the date of approval of this report.

d. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam within one year from the date of approval of this report.

APPROVED: 

JAMES G. TON

Colonel, Corps of Engineers
District Engineer

DATE: 20 Jan 1980

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

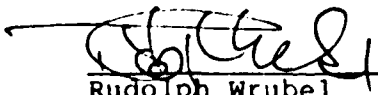
Name of Dam: Lower Aetna Lake Dam Fed ID# NJ 00418 and NJ
ID# 120 (31-52)

State Located New Jersey
County Located Burlington
Coordinates Lat. 3952.0 - Long. 7448.2
Stream Unnamed Tributary of Haynes Creek
Date of Inspection 12 November 1979

ASSESSMENT OF
GENERAL CONDITIONS

Lower Aetna Lake Dam is assessed to be in a fair overall condition, although additional hydraulic studies should be undertaken, in conjunction with all other dams in the area, to determine what improvements can be made to the inadequate spillways. It is recommended that the hazard classification be downgraded to significant as overtopping or collapse would cause only minimal damage to downstream property. Remedial actions to be undertaken in the future include: 1) selective removal of trees on the downstream slopes, 2) regrading and reseeding these slopes and 3) placing riprap in the discharge stilling basins. Consideration could also be given to building a lip curb along the downstream crest shoulder to channelize surface runoff.

The combined capacity of the spillways is inadequate and will accommodate only 4% of the 100 year design flood. Further hydraulic studies are recommended.



Rudolph Wrubel
Vice President
Louis Berger & Associates, Inc.



OVERVIEW OF LOWER AETNA LAKE DAM

December, 1979

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
NAME OF DAM: LOWER AETNA LAKE DAM FED ID# NJ 00418

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

This report is authorized by the Dam Inspection Act, Public Law 92-367, and has been prepared in accordance with Contract FPM-36 between Louis Berger & Associates, Inc. and the State of New Jersey and its Department of Environmental Protection, Division of Water Resources. The State, in turn, is under agreement with the U.S. Army Engineer District, Philadelphia, to have this inspection performed.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the structural and hydraulic condition of the Lower Aetna Lake Dam and appurtenant structures, and to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Lower Aetna Lake Dam is a 53-year old earth embankment approximately 240 feet long, having two reinforced concrete box culvert/spillway structures flanking a 120 foot concrete bulkhead which supports a series of concrete steps and bleachers for watching swimming events in front of the dam. Spillway No. 1 is located near the right extremity of the embankment while the second spillway is some 60 feet from its left hand limit. A third structure (presently plugged) lies about 100 feet beyond the left end of the embankment and discharges into a separate channel leading to an adjacent small lake. The dam was constructed as a central feature of a large residential development, apparently on the site of a series of earlier water-operated mills. This dam forms only one of a

numerous and nearly continuous succession of comparable lakes. The lake is also known as Aetna Lake and both names are used hereinafter.

b. Location

Lower Aetna Lake Dam is within the corporate boundary of the Borough of Medford Lakes, Burlington County, New Jersey. It is built across an unnamed tributary to the upper reaches of Haynes Creek which in turn becomes the southwest branch of the Rancocas near the town of Medford. It is located less than 20 miles southeast of Camden, about 3 miles south of both Medford and State Route 70, and is situated just south of secondary State Route 532 (0.2 of a mile from its intersection with Route 541).

c. Size Classification

The maximum height of the dam is approximately 12 feet and the maximum storage is estimated to be 191.6 acre feet. The dam is therefore placed in the small size category as defined by the Recommended Guidelines for Safety Inspection of Dams (maximum storage less than 1,000 acre-feet and height less than 40 feet).

d. Hazard Classification

Some damage could be inflicted on downstream property in the event of a failure of this dam, however not up to the category of "excessive" according to Corps of Engineers criteria. Based upon field observations, the classification is therefore recommended to be downgraded to significant hazard. The immediate downstream flood plain is mainly open, and the most susceptible development might be one building, a small county bridge, and portions of Tabernacle Road some 100 yards below the dam. An element that could increase the danger appreciably would be the fairly unlikely failure of this and one or more upstream dams in rapid sequence. One recorded instance mentioned only some damage to a road during a 1940 overtopping of the dam and possibly a portion of the lake shore.

e. Ownership

Aetna Lake Dam is owned, operated, and maintained by the Medford Lakes Colony Club Inc., RD#1, Medford, New Jersey.

f. Purpose of the Dam

The dam in its present form has served throughout its existence to contain a lake for recreational and scenic benefits. Earlier versions presumably were used to provide power for a mill waterwheel, although physical traces of such earlier use are not evident.

g. Design and Construction History

Construction of the dam was completed in 1926, although the formal dam application, including plans, was submitted and approved by the state in the following year. The reason for the reversed chronology was recorded as ignorance of the law requiring such application for dams in a tributary watershed of more than 1 square mile and where the stream water level is raised more than 5 feet. The application recounted previous names for the area of Aetna Furnace, Oliphant's Mill, and Ballinger's Mill, the last of these shown on an accompanying plan (that installation was apparently the site of the present dam). Modifications to one of the spillways were proposed in 1960 and again in 1971 but were not approved as submitted, and the present dam exists essentially in its original form. Details of actual construction are not known but the dam was inspected and approved both shortly after its construction and again in response to a complaint following the 1940 flooding. The 25 foot crest was intended as a roadway but is currently limited to maintenance, bicycle, and foot traffic.

h. Normal Operating Procedures

Operation and maintenance of the dam, spillways, and the lake are carried out by a full time staff employed by the owner as a part of their overall duties. Regulation of water level requires manual changes of the flashboards and coordination with operation of upstream and downstream dams.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of Aetna Lake Dam is 5.99 square miles of gently rolling sandy pine woods with considerable residential development.

b. Discharge of Dam Site

The spillway capacity with the reservoir level at the top of the dam is calculated to be approximately 187 cfs. No discharge records are available.

c. Elevation (above M. S. L.)

Top of Dam - 61.0
Recreation Pool - 57.0
Streambed at Centerline of Dam - 49.0

d. Reservoir

Length of Recreation Pool - 2600 feet
Length of Maximum Pool - 2900 feet

e. Storage

Recreation Pool - 105.6 acre-feet
Top of Dam - 191.6 acre-feet

f. Reservoir Surface

Recreation Pool - 17.6 acres
Top of Dam - 26.3 acres

g. Dam

Type - Earth embankment with three concrete box culvert spillways
Length - 240 feet
Height - 12 feet
Top Width - 25 ± feet
Slopes - Upstream - gentle lake bottom, Downstream - 1:1 or steeper
Zoning - Unknown

h. Diversion and Regulating Tunnel

None

i. Spillways

Type - Concrete arch culverts
No. 1 (Right) 4' x 4.5'
No. 2 (Center) 3.5' x 6'
No. 3 (Left) 2.5 x 2.5' (RCP)
Effective Widths:
No. 1 4.5'
No. 2 4.25'
No. 3 2'

Crest Elevation - 57 m.s.l. (flashboards in place)

Gates- Timber flashboards

U/S Channel - None (main lake reservoir)

D/S Channel

 No. 1 & 2 - Natural Streambed

 No. 3 - Artificial Channel

j. Regulating Outlets - None

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The design information available for review was limited to two drawings submitted with the 1927 application for approval of the dam. The drawings were prepared by C. Edgar Haines, P.E., of Vincentown, N.J. and provide a clear idea of the overall plan of the dam but little detail. Partial dimensions are included for only one of the three spillway structures. No design computations, structural analyses, or other technical data were found and most of the dimensions contained herein are field measurements.

2.2 CONSTRUCTION

No information was obtained regarding the actual construction and the plans noted above indicate a sand embankment with approximate 1:1 turf covered slopes, and the reinforced concrete structures. No undue settlement is indicated and the 50 year old embankment is assumed to be reasonably well compacted. Foundation soils of this vicinity are recent alluvium composed of sand, silt, some clay and surficial organic matter over deeper lying sand formations. The lake is situated along an undulating interstream divide characteristic of the central part of Burlington County and lies within a narrow strip of land covered with recent alluvium of mainly silt and sand, with some clay and significant amounts of organic matter near the surface. Underlying the alluvium, and existing as surficial soil beyond the stream divide, is the Kirkwood Sand formation, a fine micaceous quartz sand with interbedded silty sand layers. Drainage conditions within the immediate area are poor but improve to good to excellent just beyond the stream divide. Depth to bedrock is greater than 100 feet.

2.3 OPERATION

With no construction modification attendant, the present structure is considered to be essentially as shown on the original drawings. Maintenance of embankment and spillways and flashboard adjustments are performed by responsible personnel.

2.4 EVALUATION

a. Availability

Sufficient engineering data is available for a rational assessment of a dam of this size and hazard classification.

b. Adequacy

Original engineering data indicates a correct and conservative design of embankment and spillways. Field inspection confirms that it was built in accordance with the plans. Although details are lacking for construction of both embankment and concrete structures, the plans are adequate for engineering assessment purposes.

c. Validity

Validity of the 1927 design plans is not questioned but further investigations would be required to determine long term embankment stability, especially if the downstream slope erosion is allowed to continue. However, based on the assumption that the corrective measures set forth in Section 7 are undertaken, further structural investigations are not recommended to validate the small amount of engineering information available.

SECTION 3 - VISUAL INSPECTION

a. General

Visual inspection of Lower Aetna Lake Dam was conducted on 12 November 1979. Water level at that time was a few inches above the timber flashboards and flowing freely through two of the three spillways. Flashboards were in good condition, the top planks being new, and obviously in regular use. The third spillway appeared unused and serves only to equalize water levels between this and Birchwood Lake. The surface of the roadway forming the crest of the dam was of gravel and badly deteriorated macadam but is fairly even in profile.

b. Dam

In general, the dam was found to be in an old but reasonably stable condition. The reservoir water level appears to be maintained at a fairly constant level except for periods of heavy rain or cleaning of the lake bed. In normal times, the outflow is fairly uniform. A major part of the upstream face is protected by a combination of a concrete bulkhead and the concrete walls into which the spillways are set. Slopes beyond them have been modified by the placing of sand for a bathing beach and probably by some sedimentation to a low enough angle to offer no problems. Downstream slopes, on the other hand, exhibit a variety of problems in spite of some maintenance effort. With no runoff protection along the roadway, gullies were noted along the entire top of downstream slope. Most are small but they become more severe between the outlet of culverts no. 1 & 2. Original 1:1 slopes have been oversteepened in many places by erosion including some sloughing and undercutting. Soil and even riprap and bituminous slope protection have been removed from behind the the No. 2 culvert wingwalls. Seepage was noted near the base of a tree near the left end of the embankment. A combination of noncohesive soils and activity of the children of the community makes maintenance of such steep slopes difficult. Slight leaning of poles and guardrails also indicate movement on the downstream side of the embankment. The entire crest is protected with an old, weathered asphalt surface but is fairly regular in elevation in spite of its deteriorated condition. Much of the crest appears to be at a slightly

higher elevation than that of the surrounding terrain, such that overtopping would flow around the sides of the dam before cresting the embankment proper.

c. Appurtenant Structures

The upstream concrete bulkhead is in true horizontal and vertical alignment and the concrete is in good condition with only minor and infrequent cracking and spalling. Junctions with the embankment are generally good. The concrete spillway structures are likewise in satisfactory alignment and condition. The culverts and their downstream wingwalls also display only minor spalling, but effects of embankment slope problems are again evident in the walls of culvert #1 being tilted approximately 4 inches out of plumb. As noted earlier, culvert #3 is heavily silted and can transmit little active flow. Culvert #1 has three steps from the floor of the intake structure varying from 3.5' to 4' to 6' in height by 4.5' wide, while culvert no. 2 is a uniform 3.7' by 6.2' in section. All heights are at the center of a slight arch. There are no other auxiliary spillways unless parts of the lake shore may serve such purpose as suggested in the original application. This could not be determined without precise leveling surveys.

d. Reservoir Area

Lower Aetna Lake has a stable, well-defined shoreline emphasized by the numerous bulkheads and docks fronting most of the lakeside homes. Some silting of the lake has occurred during its lifetime and periodic cleaning of the bottom, at least near the shore line has been performed. Although only a few feet above normal lake levels, flooding of homes has apparently been very rare.

e. Downstream Channel

The bed of this unnamed stream, (although identified in the 1927 application as Sharps Branch) curves gently through a wooded park-like flood plain that averages about 200 feet wide before flowing into the next lake a half mile below the dam. The downstream flood plain is part of the E. Earle Jackson Memorial Park and has been landscaped and maintained as such.

The bridge at Tabernacle Road and building a short distance from the dam show no signs of any recent effects of high water. Water and channel were clear at the time of inspection. However, it was noted that Tabernacle Road is several feet below the dam crest.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

No specific procedures were observed by the inspection team, but maintenance staff members provided verbal descriptions of their duties concerning the dam. Condition of the active spillways and flashboards was good, and they are obviously kept in effective working order.

4.2 MAINTENANCE OF DAM

The Colony Club personnel are responsible for general maintenance of the embankment and appurtenant structures. No recent repair of the culverts has been accomplished and the main activity regarding the embankment seems to be continuing efforts to stabilize the erosion problems of the downstream slope. The roadway pavement is in poor condition (it carries little vehicular traffic) but discharges all the surface flow on the side slopes.

4.3 MAINTENANCE OF OPERATING FACILITIES

These facilities are limited to the three simple spillways. All appear sound, and the two located in the embankment are clear and functional. The third one shows neglect and serves only a limited purpose.

4.4 DESCRIPTION OF WARNING SYSTEM IN EFFECT

No formal system exists, but communication with other upstream and downstream owners is reportedly undertaken during storms or other special cases. The full time personnel are able to keep a close check on their own lakes, and most of those responsible for other lakes cooperate in their joint efforts and responsibilities.

4.5 EVALUATION OF OPERATIONAL ADEQUACY

Given the limits in the capacity of the spillways and culverts, and the informality but effective employment of the warning system, the procedures are deemed adequate in view of the lack of intensive development immediately downstream. Much depends on direct human effort and its coordination, and Aetna Lake Dam enjoys a distinct advantage in having full time staff people available.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data

In accordance with the criteria in the Recommended Guidelines for Safety Inspection of Dams, it has been determined that the dam at Lower Aetna Lake is small in size and significant hazard. Accordingly, a 100-year frequency event was selected as the design storm and an inflow hydrograph was calculated using precipitation data from Technical Paper 40 and NOAA Technical Memorandum NWS Hydro-35.

The routed outflows from Upper Stokes, Lake Stockwell, and Upper Aetna Lake dams were included in the inflow to Aetna Lake as these dams lie immediately upstream and lie within the overall drainage basin of Aetna Lake. Inflow also included that due to the intermediate drainage area between Upper and Lower Aetna Lakes.

The inflow to the reservoir for the selected 100-year storm was computed utilizing the HEC-1 computer program. This gave a peak inflow to the reservoir of 5311 cfs which when routed, was reduced to 5205 cfs. The combined spillways have a maximum discharge capacity of approximately 187 cfs before overtopping occurs and thus can accommodate only 4% of the design flood and is therefore inadequate.

b. Experience Data

No meaningful original design data was available for review. Records do indicate, however, that the dam was overtopped in September, 1940. This overtopping caused little damage to the embankment and downstream environs.

c. Visual Observations

There is little that can be done to appreciably increase the discharge capacity of the present spillways without major reconstruction. At the time of inspection the water level in the lake was approximately 1 foot below normal pool elevation. The lake had been lowered to facilitate maintenance of lakeside docks.

d. Overtopping Potential

Based on the results of the hydraulic analysis, the capacity of the spillways is inadequate to accommodate the Standard Design Flood (SDF) and thus, the potential remains substantial. There is, however, only one recorded incident of overtopping (September, 1940). A reasonable depth of overtopping above 2 feet cannot be foreseen because at that elevation, the water would inundate large portions of the surrounding community and further rising of the flood would not be expected.

e. Drawdown

At the present time complete drawdown is not easily accomplished as there is no practical method of removing all the stoplogs. However, in an emergency with the planking removed by force, the lake would take approximately one half day to drawdown from normal pool (El. 57) to the base of the stoplogs (El. 51.3).

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Based upon the existing conditions inspected in the field and review of the one set of original design plans, the dam is judged to be in relatively sound structural condition except for erosion on the downstream slope. The ratio of embankment width to height is favorable to its stability, and concrete spillway and culvert structures appear to be satisfactory in quality and attitude after the 50 years of service. In addition to the erosion, which affects the entire backslope to varying degrees from crest to toe, one instance of seepage was observed that is probably related to the root system of a tree. More serious questions involve the very restricted total discharge capacity and its relationship to potential stress on the dam. A related question might be whether overtopping of any part of the lake is intended to bypass the dam itself as noted in the 1927 letter of application. No clearly defined auxiliary spillway exists.

b. Design and Construction Data

Although no design computations were available, the comparatively small concrete structures exhibit only minor cracking and spalling. These structures and embankment show no evidence of differential settlement problems.

c. Operating Records

No records are available but the dam appears to be operating satisfactorily. The only recorded instance of overtopping occurred almost 40 years ago, and a subsequent inspection of the dam disclosed no significant damage.

d. Post Construction Changes

There have been none beyond routine maintenance of embankment slopes and replacement of flashboards. Earlier proposed spillway changes were not accomplished as the owners did not succeed in obtaining State approval.

e. Seismic Stability

Lower Aetna Lake Dam is located in Seismic Zone 1 and due to embankment width versus lesser height has negligible potential earthquake vulnerability. Depth to bedrock is over 100 feet. Experience indicates that Zone 1 dams with adequate stability under static loads will satisfactorily resist dynamic loadings.

SECTION 7 - ASSESSMENTS/RECOMMENDATIONS/
PROPOSED REMEDIAL MEASURES

7.1 DAM ASSESSMENT

- a. Subject to the inherent limitations of the Phase I visual inspection, Lower Aetna Lake Dam is classified as being in fair overall structural condition although the spillways are incapable of passing the design flood. The dam embankment was built of unknown specific composition, but due to its width to height ratio is believed to be sufficiently impervious to withstand normal hydraulic heads. The present spillway capacity does not meet the requirements of the Recommended Guidelines for Safety Inspection of Dams, being able to accommodate only 4% of the design flood as calculated by Corps of Engineers criteria. The calculated SDF would overtop the dam by 4 feet causing damage primarily to the downstream face. It is noted that the theoretical overtopping height is very conservative in that the surrounding terrain is so flat that the higher elevations of overflow would be substantially relieved by discharge into the adjacent level areas which would diminish any further rise. Thus, the overall condition would not increase the danger to human life. A suitable increase in spillway capacity would require major reconstruction effort.

b. Adequacy of Information

The information gathered for the Phase I inspection is deemed to be adequate regarding the structural stability of the dam. However, no recent survey or inspections have been made since 1971 when Division of Water Policy engineers inspected the dam. The full content of their report is unknown.

c. Urgency

It is recommended that the remedial measures enumerated below be taken under advisement in the future.

d. Necessity for Further Study

Due to the hazard classification and the fact that this dam is the lowest member of a near continuous

chain of at least ten dams, further hydraulic studies are recommended, taking into account the entire reach of the stream system and the hydraulic interface between dams.

7.2 RECOMMENDATIONS/REMEDIAL MEASURES

a. Recommendations

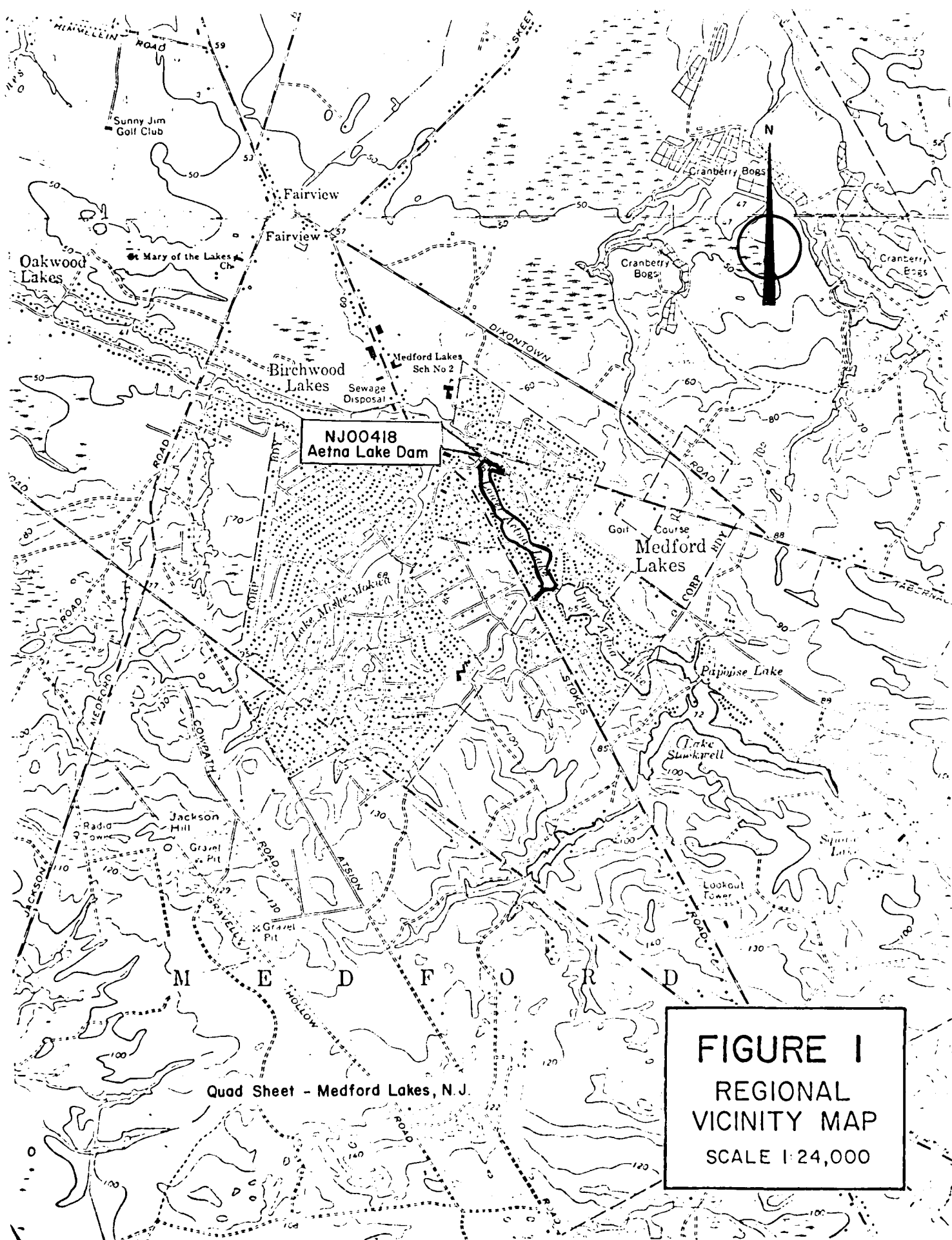
On the basis of this visual inspection, improvements to the present spillways should be held in abeyance until further studies are made. In addition to increasing spillway capacity, some thought should be given to the development of auxiliary facilities. Additionally, embankment areas behind the culvert wingwalls that have been eroded should be regraded and covered with slope protection.

Other remedial measures to be taken under advisement include:

1. Selective removal of trees and dead root systems on the downstream embankment to lessen piping potential.
2. Diversion of water at the crest of the downstream slope to avoid gullyng. Consideration should be given to constructing an extended asphalt lip curb along the rear edge of the pavement to control the run-off.
3. Regrading, compacting, and seeding or sodding the various sloughed areas on the backslopes.
4. Placing riprap or energy attenuation material in the downstream main spillway channel to lessen the scouring of the stilling basin and the eventual undercutting of the inverts, (especially at Spillway No. 1).

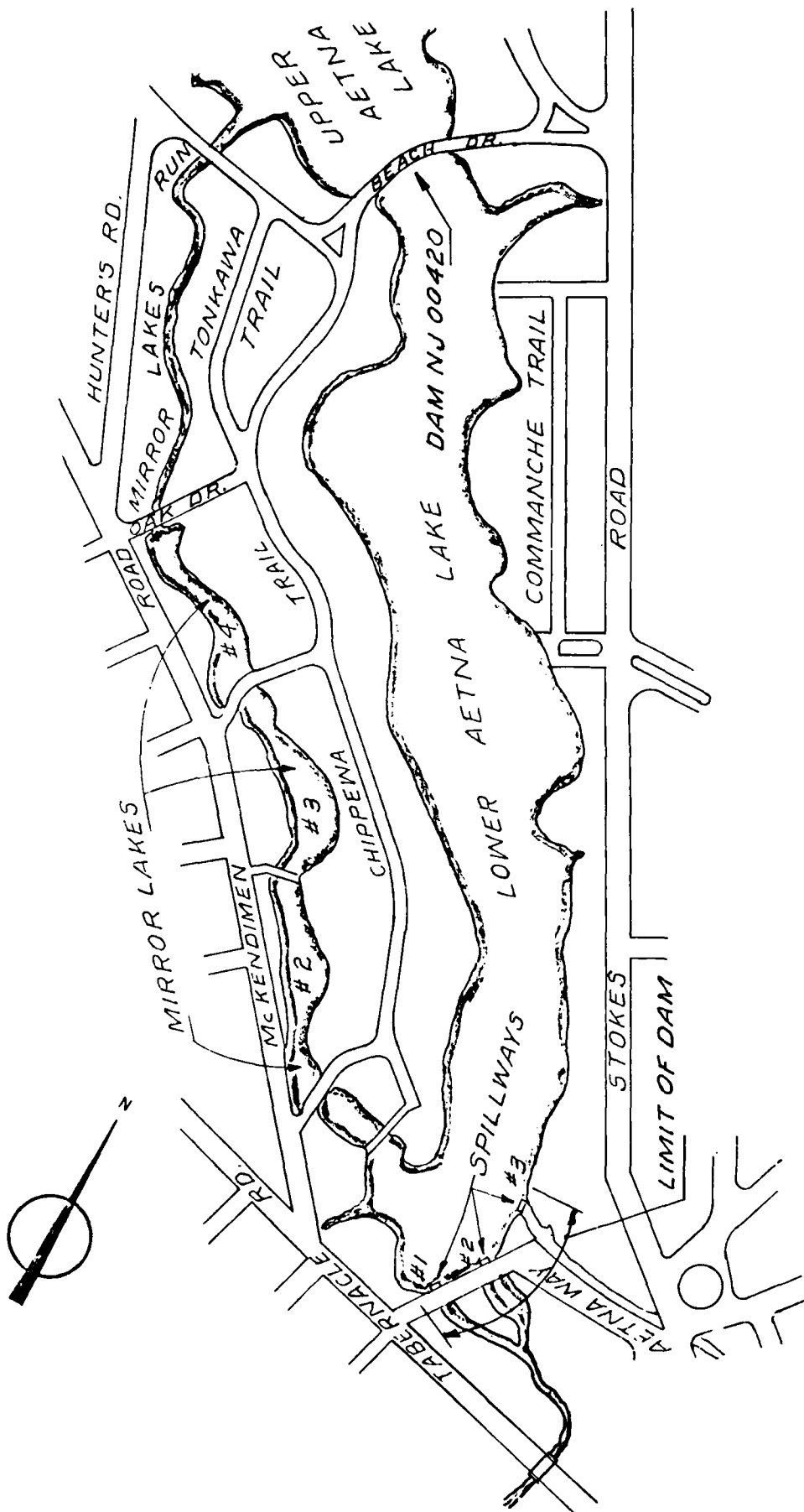
b. O&M Maintenance and Procedures

In the near future, the owner should develop written operating procedures and a periodic maintenance plan to insure the safety of the dam. Also, communication with all of the owners of the lakes involved should continue regarding any sudden changes in their discharge.



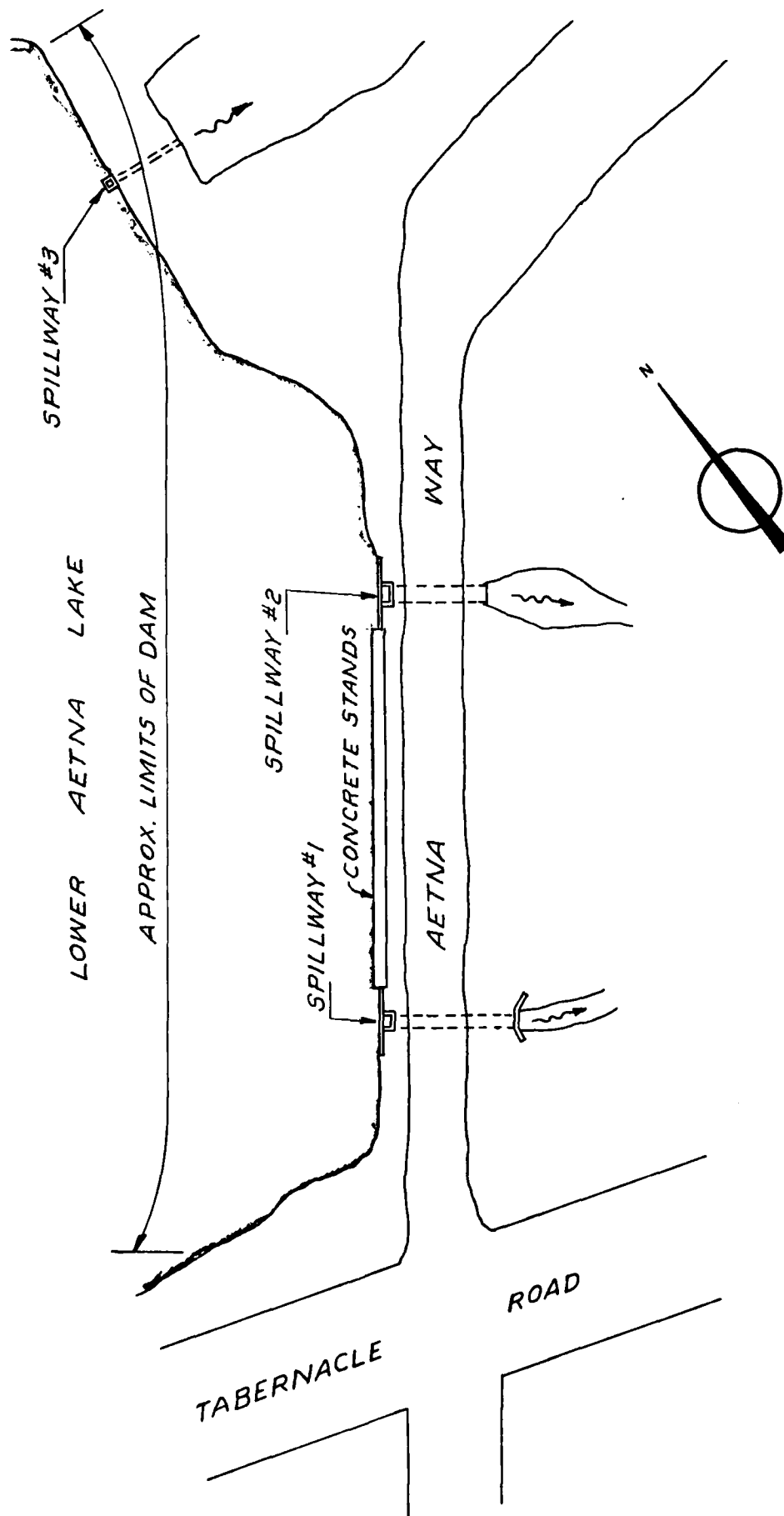
Quad Sheet - Medford Lakes, N.J.

FIGURE I
REGIONAL
VICINITY MAP
SCALE 1:24,000



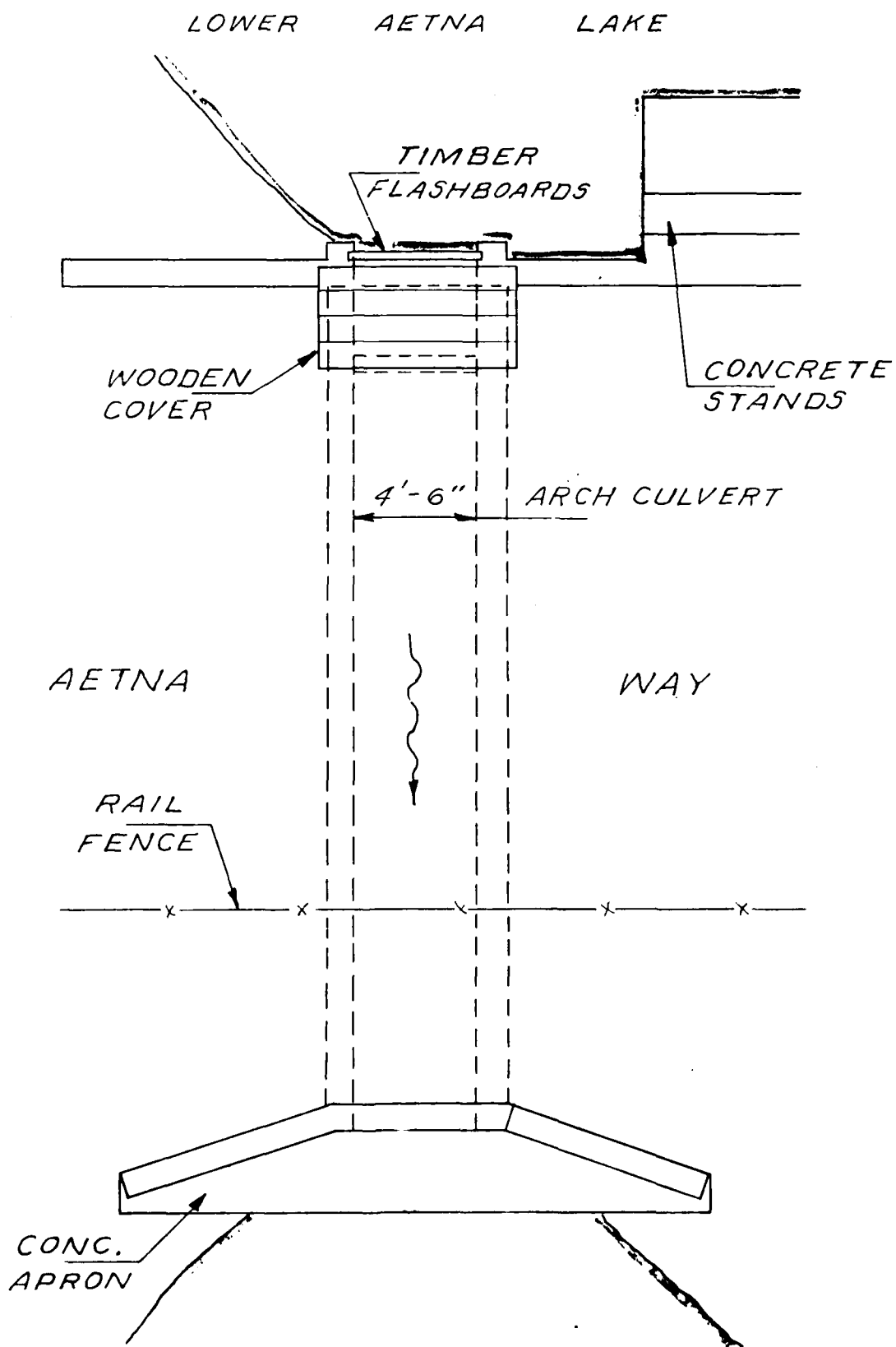
LOCATION PLAN
NOT TO SCALE

FIGURE 2



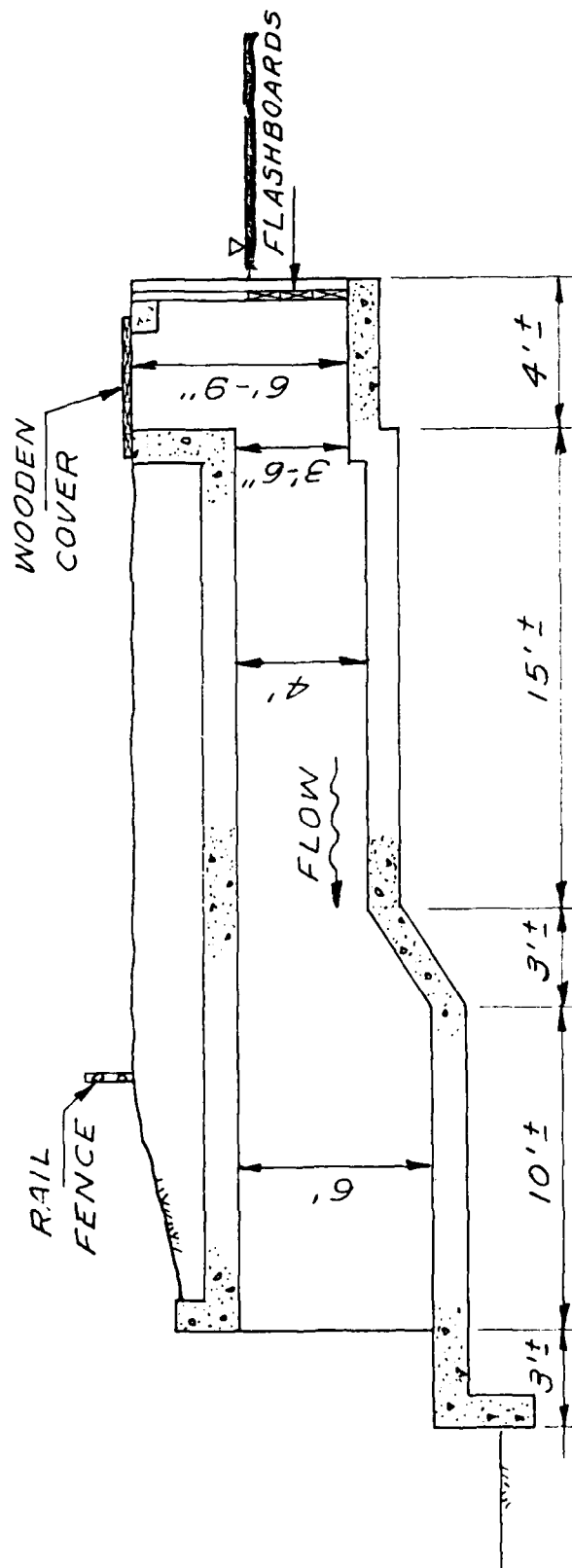
PLAN
NOT TO SCALE

FIGURE 3

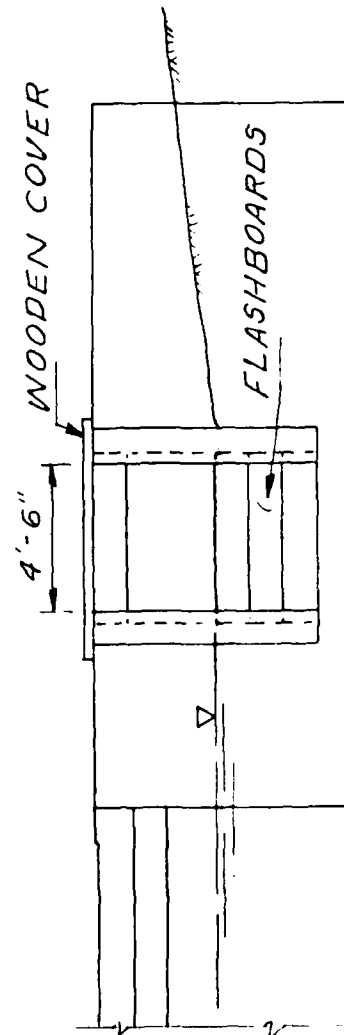


PLAN-SPILLWAY NO. 1
NOT TO SCALE

FIGURE 4

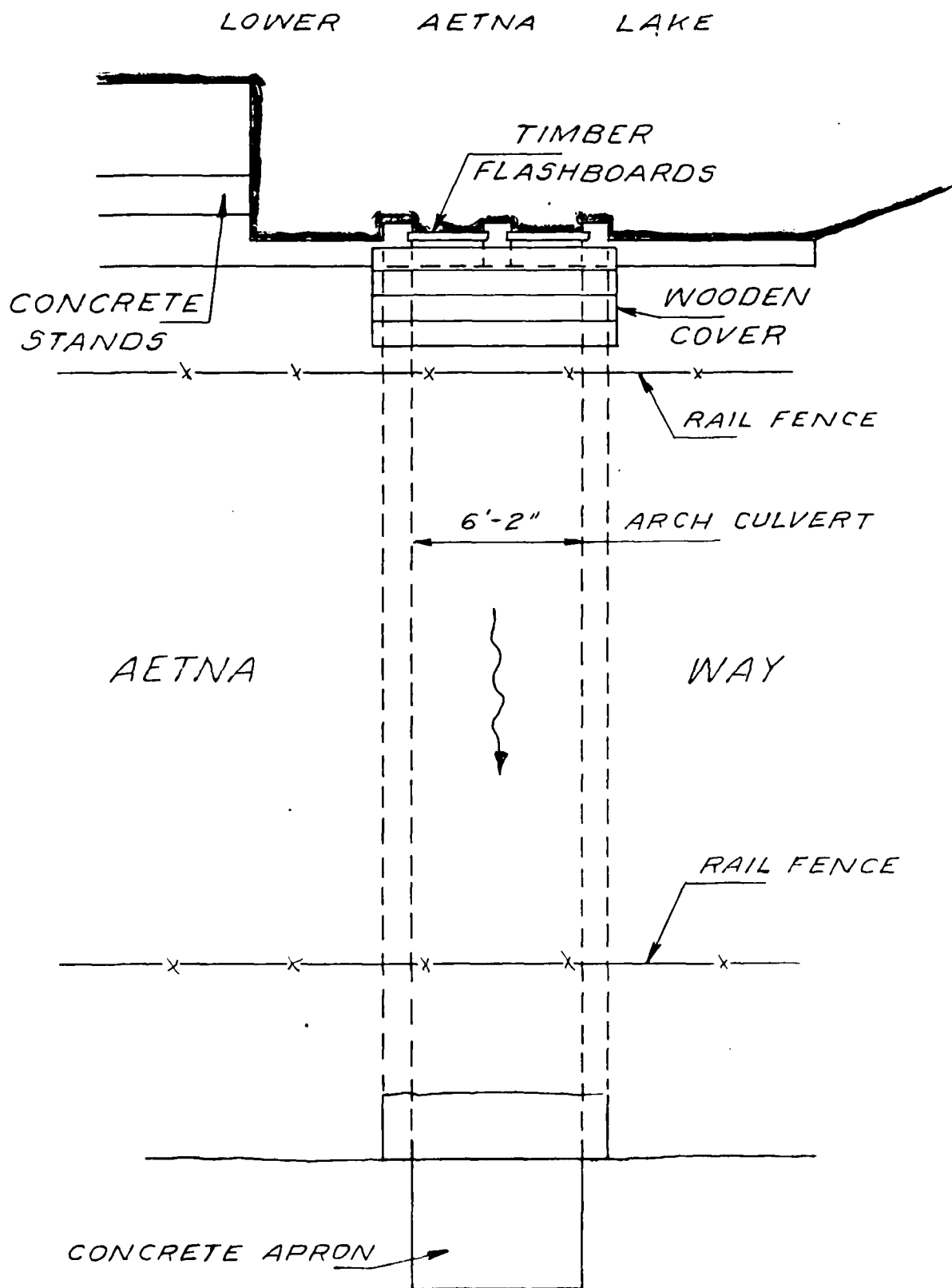


SECTION THRU SPILLWAY



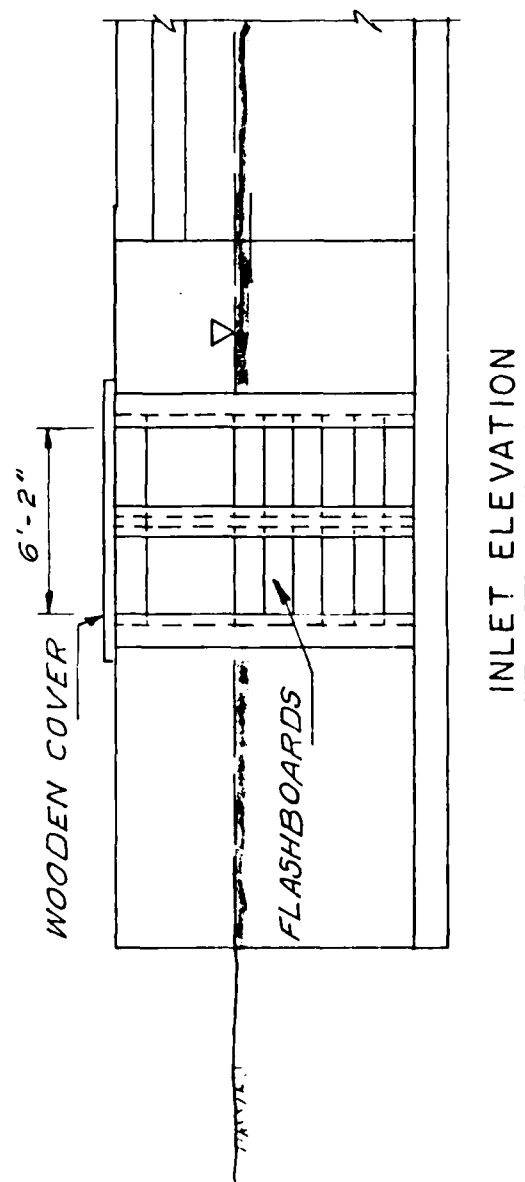
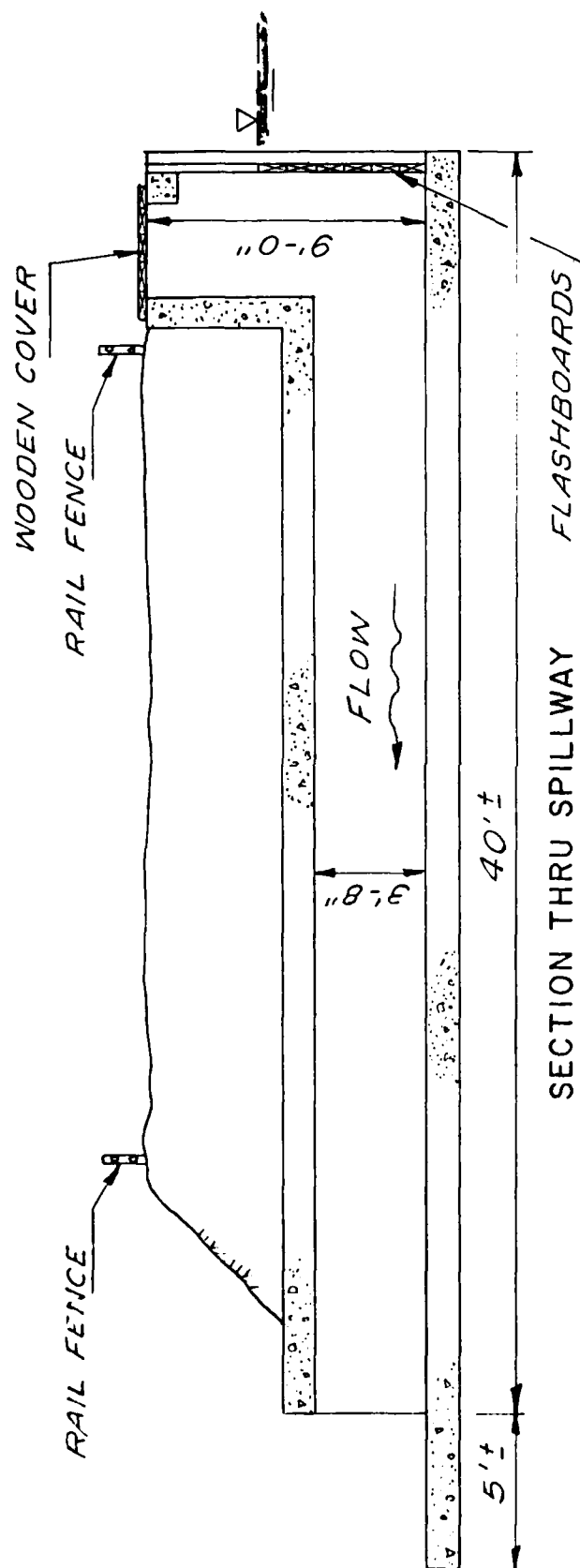
INLET ELEVATION

SPILLWAY NO. 1
FIGURE 5



PLAN-SPILLWAY NO. 2
NOT TO SCALE

FIGURE 6



SPILLWAY NO. 2
FIGURE 7

Check List
Visual Inspection
Phase 1

Name Dam Aetna Lake County Burlington State New Jersey Coordinators NJDEP

Date(s) Inspection 11-12-79
12-24-79 Weather Cloudy Temperature 50°

Pool Elevation at Time of Inspection 57.5 M.S.L. Tailwater at Time of Inspection 49.2 M.S.L.

Inspection Personnel:

L. Baines E. Simone
J. Voorhees K. Jolls
D. Lang

D. Lang Recorder

511887 1

EMBANKMENT

VISUAL EXAMINATION OF		REMARKS OR RECOMMENDATIONS
OBSERVATIONS		

SEE PAGE ON LEAKAGE

STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	120' concrete bulkhead with bleachers. Junction at embankment is good. 2 - timber docks approximately 40' long extend into lake.
--	---

DRAINS	none observed
--------	---------------

WATER PASSAGES	none through bulkhead
----------------	-----------------------

FOUNDATION	unknown
------------	---------

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	minor cracking and spalling near south end of bulkhead	
STRUCTURAL CRACKING	minor cracks at vertical joints	
VERTICAL AND HORIZONTAL ALIGNMENT	bulkhead in true alignment, overall condition of concrete in good shape.	
MONOLITH JOINTS	satisfactory	
CONSTRUCTION JOINTS	good	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Top embankment serves as a roadway and is surfaced with a variety of materials i.e. asphalt, gravel, sand etc... no major cracks seen, embankment top width approx. 23' ±	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	Sloping and undercutting occurring near toe around culvert No. 2	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Crest erosion along entire length, particularly severe between culverts No. 1 and No.2. Slopes vary from 1H: 1V to near vertical. Some undermining and undercutting found behind headwall of culvert No.2.Erosion at south end due in part to pedestrian traffic.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Fair condition, roadway surface uneven in some places mainly attributed to surface runoff erosion.	
RIPRAP FAILURES	Rip rap failures behind No.2 box culvert headwalls, evidence of asphalt slope protection but almost all has washed away.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	fair - roadway embankment	
ANY NOTICEABLE SEEPAGE		free flowing seepage just south of No. 2 culvert coming through along root system of tree embankment. standing water at toe between culverts No. 1 and No. 2 could be seepage or remains of recent rainfall.
STAFF GAGE AND RECORDER	none	
DRAINS	none	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	minor spalling of culvert No.2 d/s slab ↑	
INTAKE STRUCTURE	concrete culverts with timber flash-boards.	Condition satisfactory.
OUTLET STRUCTURE	concrete culverts with headwalls for No.1 and No.2 30" Ø RCP for No.3 (heavily silted and partially plugged).	
OUTLET CHANNEL	meandering natural channel small pool below No.2	
EMERGENCY GATE	none	

UNCATED SPILLWAY N/A

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	N/A	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE AND PIERS	N/A	

①

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL		
APPROACH CHANNEL	Lower Aetna Lake main reservoir	
DISCHARGE CHANNEL	(see downstream channel sect.)	
BRIDGE AND PIERS	none	
GATES AND OPERATION EQUIPMENT	hand removed timber flashboards	

INSTRUMENTATION			REMARKS OR RECOMMENDATIONS
VISUAL EXAMINATION MONUMENTATION/SURVEYS	none		
OBSERVATION WELLS	none		
WEIRS	none		
PIEZOMETERS	none		
OTHER			

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	gentle near dam, beach and bathing area at north end of dam rising more steeply at south end, most homes along lake have constructed bulkheads.	
SEDIMENTATION	slight at south end near culvert No.3	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	County bridge approximately 100 yds. downstream (slightly restricted hydraulic opening)	
--	--	--

SLOPES	gentle, flat flood plain for culverts No.1 and No.2 culvert No.3 drains into roadway ditch 4-5' wide. Downstream area is E. Earle Jackson Town Park; roughly graded and landscaped.	
--------	--	--

APPROXIMATE NO. OF HOMES AND POPULATION	numerous commercial buildings about 8' above channel - all below Tabernacle Road crossing and above flood line.	
---	--	--

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	Available - 1927 reconstruction NJDEP Division of Water Resources - Bureau of Flood Plain Management: Trenton, New Jersey.
REGIONAL VICINITY MAP	Available - USGS Quad - Medford Lakes, N.J.
CONSTRUCTION HISTORY	Available - NJDEP
TYPICAL SECTIONS OF DAM	None available
HYDROLOGIC/HYDRAULIC DATA	Some available, however information was primarily for unapproved spillway reconstruction design - NJDEP
OUTLETS - PLAN	Not available
- DETAILS	" "
-CONSTRAINTS	" "
-DISCHARGE RATINGS	" "
RAINFALL/RESERVOIR RECORDS	None available

REMARKS

ITEM

SPILLWAY PLAN Not available

SECTIONS

"

"

DETAILS

"

"

OPERATING EQUIPMENT
PLANS & DETAILS

None available

ITEM	REMARKS
DESIGN REPORTS	None available
GEOLOGY REPORTS	" "
DESIGN COMPUTATIONS	None Available
HYDROLOGY & HYDRAULICS	" "
DAM STABILITY	" "
SEEPAGE STUDIES	" "
MATERIALS INVESTIGATIONS	None available
BORING RECORDS	" "
LABORATORY	" "
FIELD	" "
POST-CONSTRUCTION SURVEYS OF DAM	None available
BORROW SOURCES	Unknown

ITEM	REMARKS
------	---------

MONITORING SYSTEMS None

MODIFICATIONS None

HIGH POOL RECORDS None available

POST CONSTRUCTION ENGINEERING Records of application for reconstruction of spillway #2
STUDIES AND REPORTS available

PRIOR ACCIDENTS OR FAILURE OF DAM None known
DESCRIPTION - not available
REPORTS - not available

MAINTENANCE none available
OPERATION none available
RECORDS none available



November, 1979

View of Outlet

SPILLWAY No. 1



November, 1979

View of Inlet



November, 1979

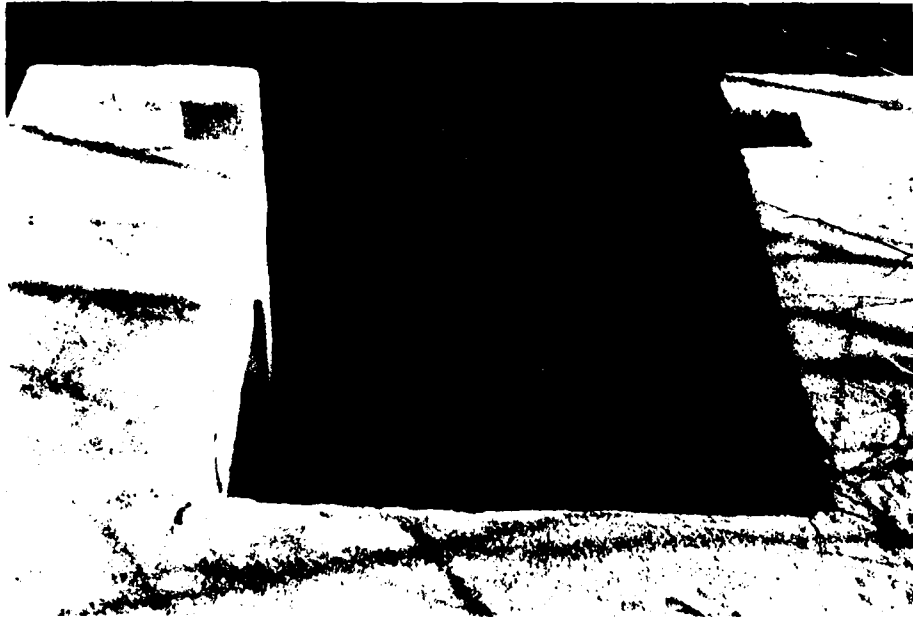
View of Outlet

SPILLWAY No. 2



November, 1979

View of Inlet



View of Inlet

December, 1979

SPILLWAY NO. 3



View of Outlet

November, 1979



November, 1979

View of Downstream Embankment



November, 1979

View of Downstream Embankment
to the left of Spillway #1

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 5.99 square mile
ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 57 M.S.L. (105.6 acre-feet)
ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 61 M.S.L. (191.6 acre feet)
ELEVATION MAXIMUM DESIGN POOL: _____
ELEVATION TOP DAM: 61 M.S.L.
CREST: _____

- a. Elevation 61 M.S.L.
- b. Type Earth embankment with three concrete box culvert spillways
- c. Width 25± feet
- d. Length 240 feet
- e. Location Spillover #1 @ right abutment #2 @ 60' from left abut.
- f. Number and Type of Gates _____

OUTLET WORKS: main spillway

- a. Type 2 - celled concrete box culvert
- b. Location 60' from left abutment
- c. Entrance inverts 57 M.S.L.
- d. Exit inverts 49 M.S.L.
- e. Emergency draindown facilities timber flashboards

HYDROMETEOROLOGICAL GAGES: None

- a. Type _____
- b. Location _____
- c. Records _____

MAXIMUM NON-DAMAGING DISCHARGE: 187 cfs

BY L.P. DATE 12-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A1 OF

CHKD. BY J.S. DATE 12-79

LOWER AETNA LAKE DAM

PROJECT C-248

SUBJECT _____

Time of concentration

California Culverts Practice

Length along longest watercourse = .83 mi = 4,400 feet

$\Delta H = 130 - 57 = 73$ feet

$$t_c = \left(\frac{11.9 L^3}{H} \right)^{0.385} = \left(\frac{11.9 (.83)^3}{73} \right)^{0.385}$$

DESIGN OF STORM
DRAINAGE SYSTEM

$t_c = 0.401$ hrs

Alternate method

Assume velocity = 2.0 ft-sec⁻¹

$$\therefore t = \frac{2400 \text{ ft}}{2 \text{ ft-sec} \times 3600 \frac{\text{sec}}{\text{hr}}} = .333 \text{ hr}$$

Overland flow

$\Delta H = 130 - 70 = 60$

$$\text{Slope} = \frac{60 \times 100}{2000} = 3\%$$

Assume velocity = 2 ft-sec⁻¹

$$\therefore t' = \frac{2000}{2 \times 3600} = 0.28 \text{ hr}$$

Total = .333 + .28 = .611 hrs

BY L.B. DATE 3-99

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A2 OF

CHKD. BY DATE

LOWER ATTINA LAKE DAM

PROJECT C246

SUBJECT

USE $t_c = 0.51$ hrs

$$T_p = \frac{D}{2} + 0.6 t_c$$

$$= \frac{0.25}{2} + 0.6(0.51)$$

$$= 0.431 \text{ HRS}$$

INTERMEDIATE D.A. = 0.48 mi^2

$$Q_p = \frac{484(D.A.)}{T_p}$$

$$= \frac{484(0.48)}{0.431}$$

$$= 539 \text{ CFS}$$

UNIT GRAPH

TIME (HRS)	T/T_p	DIMENSIONLESS COORDINATE (D.O.)	Q (CFS) $= Q_p \times D.O.$
0.25	0.53	0.564	304
0.50	1.16	0.946	510
0.75	1.74	0.454	245
1.00	2.32	0.202	109
1.25	2.90	0.085	46
1.50	3.48	0.037	20
1.75	4.06	0.0174	9

$$\Sigma = 1242 \text{ CFS}$$

CHECK: $1242 \text{ ft}^3/\text{sec} \times 3600 \text{ sec/hr} \times 1 \text{ mi}^2 / 5280^2 \times 1/48 \text{ in} \times 1/4 \times 15$

$$= 1 \text{ mi}^3$$

BY J. C. DATE 12-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A3 OF

CHKD. BY _____ DATE _____

MEDFORD LAKE DAM INSPECTIONPROJECT C246SUBJECT DEPTH - DURATION RAINFALL DATA FROM TP 40 & HMP 35

100 YR FREQUENCY

TIME	PRECIPITATION	Δ	REARRANGE
0.25	1.7	1.7	0.06
0.50	2.4	0.7	0.06
0.75	2.8	0.4	0.06
1.00	3.1	0.3	0.06
1.25	3.5	0.4	0.07
1.50	3.7	0.2	0.07
1.75	3.86	0.16	0.08
2.00	4.00	0.14	0.09
2.25	4.11	0.11	0.09
2.50	4.22	0.11	0.09
2.75	4.31	0.09	0.11
3.00	4.40	0.09	0.11
3.25	4.49	0.09	0.30
3.50	4.57	0.08	0.70
3.75	4.64	0.07	1.70
4.00	4.71	0.07	0.40
4.25	4.78	0.07	0.40
4.50	4.84	0.06	0.20
4.75	4.90	0.06	0.16
5.00	4.96	0.06	0.14
5.25	5.02	0.06	0.07
5.50	5.08	0.06	0.06
5.75	5.14	0.06	0.06
6.00	5.20	0.06	0.06

A4

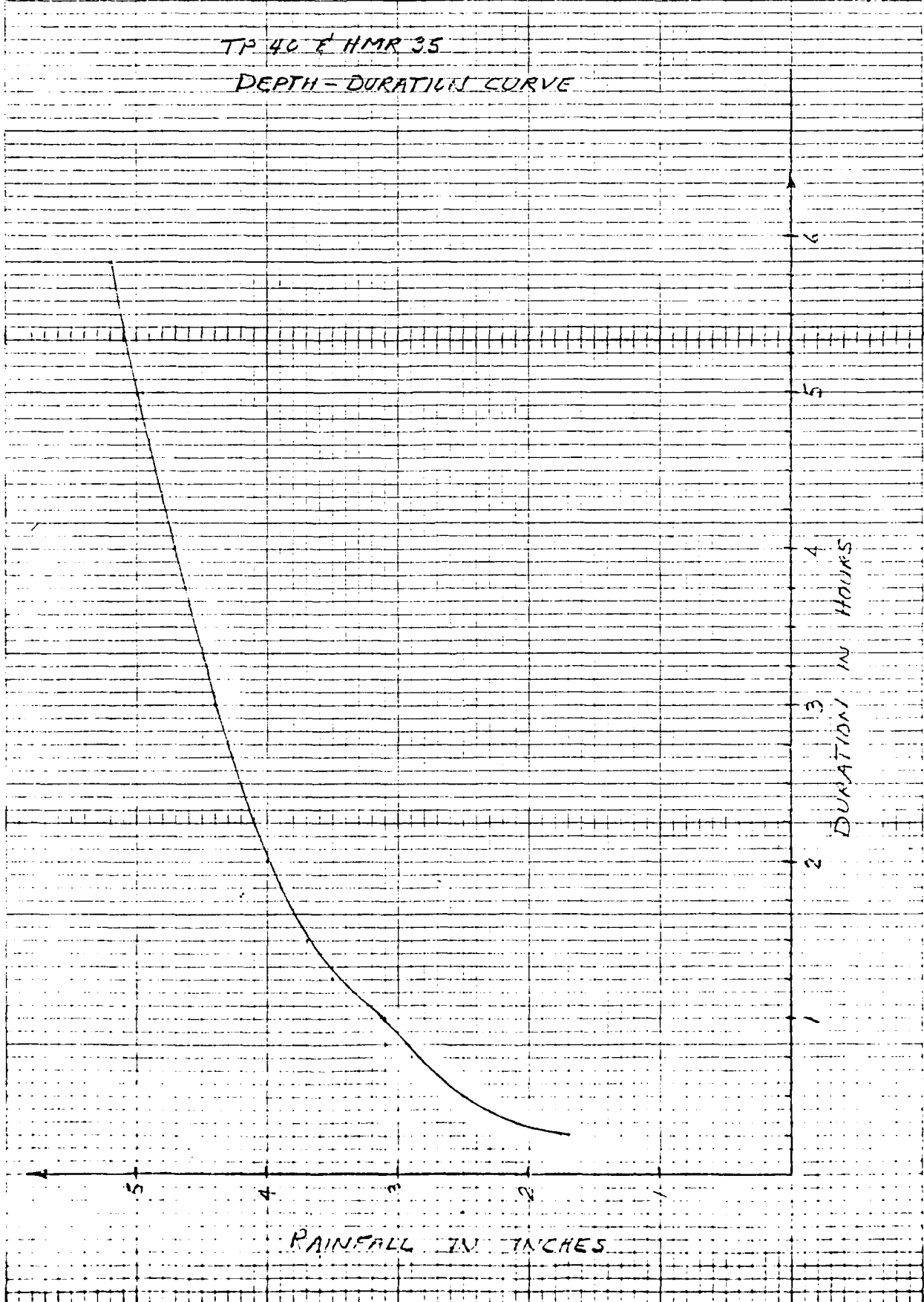
J.C. 12-79

MEDFORD LAKES DAM INSPECTION

C246

TP 40 E HMR 35

DEPTH-DURATION CURVE



46 0705

10 X 10 TO THE INCH 2 X 10 INCHES
NOTED BY USER CO. MADE IN U.S.A.

BY: J. C. ... DATE 12/12/79

CHKD. BY: ... DATE

SUBJECT: ...

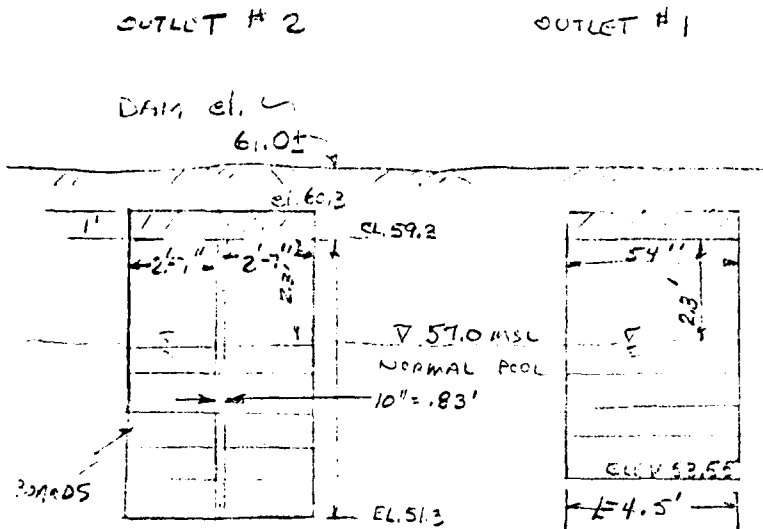
LOUIS BERGER & ASSOCIATES INC.

LOWER ACENA LAKE DAM

SPILLWAY CALCULATIONS

SHEET NO. A5 OF

PROJECT C246



NOTE: Outlet 3

appears to be a leveling culv. (18") with neglig effect on outlet flow since it is clogged

FLOW OVER DAM

SPILLWAY DISCHARGE

EL. 57.0 MSL SHARP CREST WEIR

$$Q = C L H^{3/2} \text{ where } L = 5.4'$$

C = 3.2 KINGS HUBB H10 P. 514 FIG 5-2 C = 3.3 KINGS

WEIR BETWEEN 57 & 59.3

EL. 53.55 MSL SHARP CREST WEIR

$$Q = C L H^{3/2} \text{ where } L = 5.4' = 4.5'$$

WEIR BETWEEN 57 & 59.3

ORIFICE BETWEEN EL. 59.3 - 61 ORIFICE BETWEEN EL. 57.3

$$Q = C A \sqrt{2gh}$$

$$Q = C A \sqrt{2gh}$$

$$C = .62 \quad A = 5.4 \times 2.3 = 12.4' \quad C = .62 \quad A = 2.3 \times 4.5 = 10.4'$$

(PAGE THREE)

WEIR FLOW OVER EL. 61.0

$$Q = C L H^{3/2}$$

BROAD CRESTED WEIR

$$\text{where } L = 240' \quad C = 2.7$$

BY J.C. DATE 12/12/29

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 16 OF

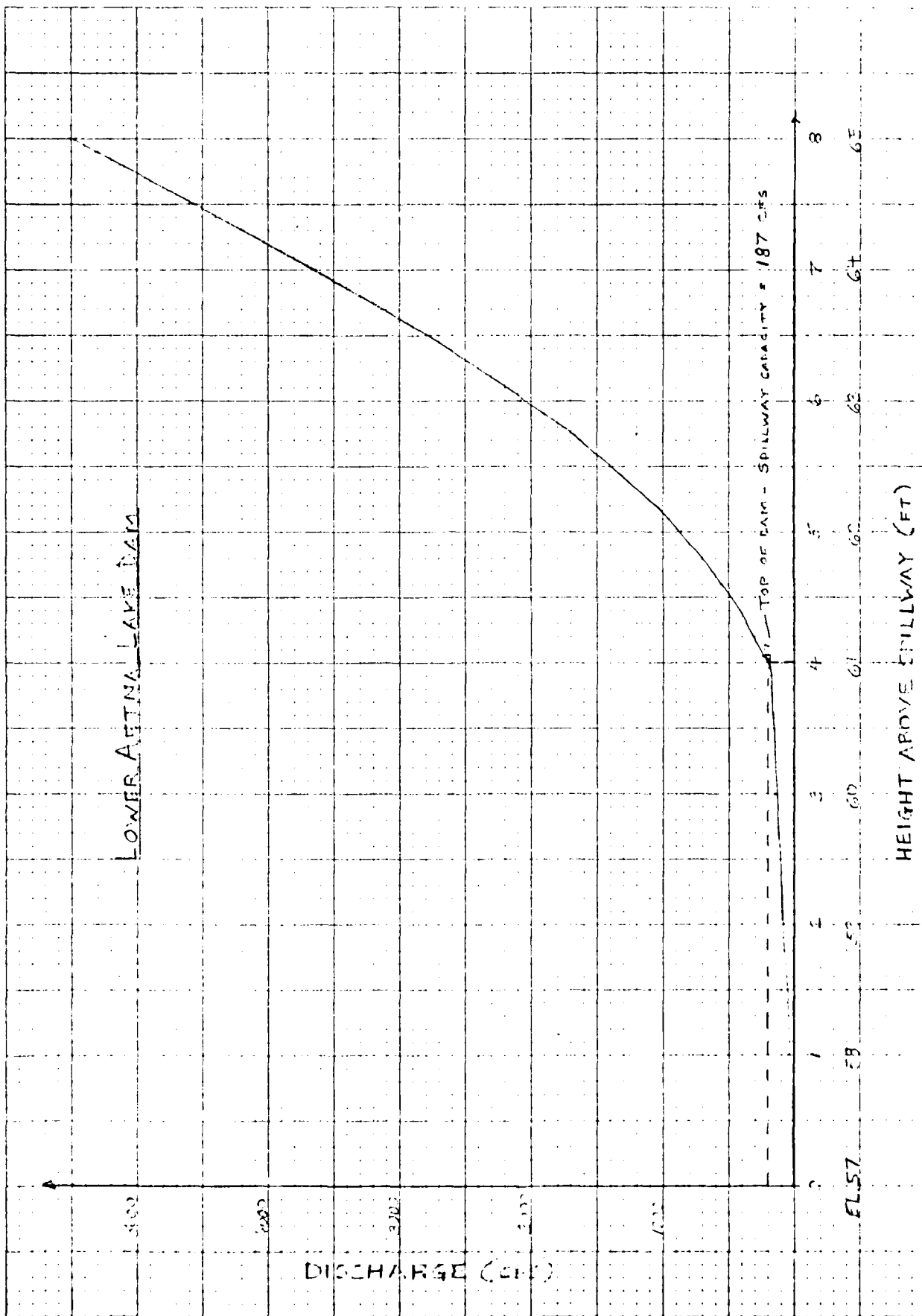
CHKD. BY _____ DATE _____

LOWER ALTON LAKE DAMPROJECT C246

SUBJECT _____

SPILLWAY CALCULATIONS (cont.)

OUTLET # 2					OUTLET # 1				FLOW OVER DAM				TOTAL
ELEV.	H	C	L	Q	H	C	L	Q	H	C	L	Q	
WEIR					FLOW								
57			3.3	5.4									
58	1		"	18	1	3.3	4.5	14					32
59	2		"	49	2	"	"	41					90
59.3	2.3		"	60	2.3	"	"	51					111
CRIFICO					FLOW								
60	1.85	.62		80	1.85	.62		70					150
61	2.85	.62		100	2.85	.62		87					187
									Rising Crested Weir				
62	3.75	"		116	3.85	"		101	1	2.7	240	646	865
63	4.35	"		130	4.85	"		113	2	"	"	1832	2075
64	5.85	"		143	5.85	"		125	3			3367	3625
65	6.85	"		155	6.85	"		135	4			5194	5474
66	7.85	"		162	7.85	"		144	5			7245	7555



BY S.E. DATE 12/12/77

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A-8 OF

CHKD. BY DATE

LOWER AETNA LAKE

PROJECT C-246

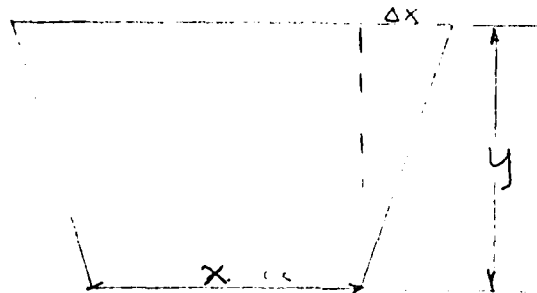
SUBJECT

RESERVOIR STAGE - CAPACITY CURVE

AREA OF LAKE AT EL 57.0 = 17.6 AC.

AREA OF LAKE AT EL. 65 = 24.11 AC.

AREA 65' CONTOUR - INCLUDED FROM USGS - 30.3 AC



FROM 57 - 60; $\Delta y = \frac{2.17}{2}$

FROM 60 - 65 $\Delta y = \frac{1.23}{2}$

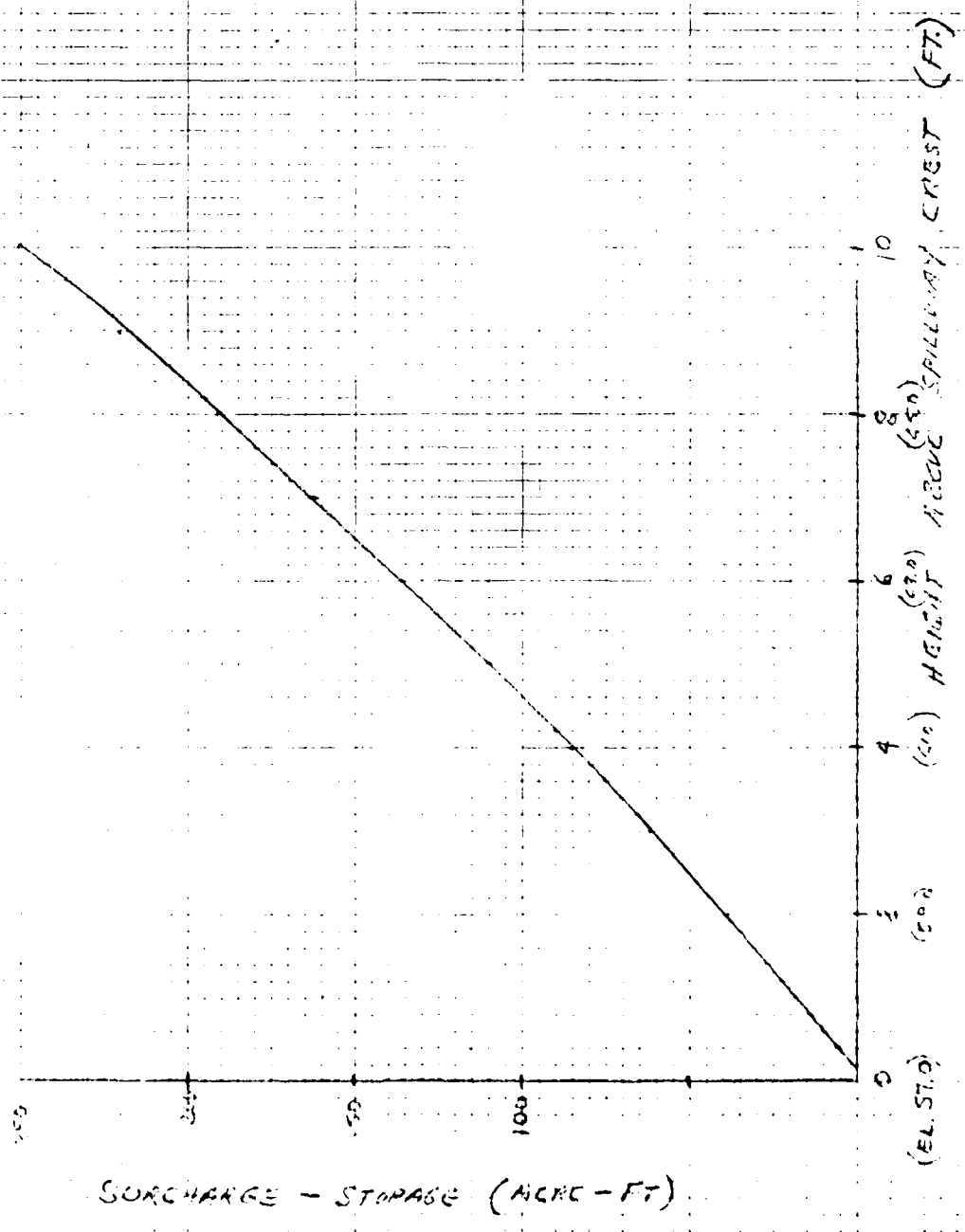
Increment in Vol $\Delta V = (x + \Delta x) \times y$

EL. HEIGHT ABOVE CL. Δy (x + Δx) SURCHARGE STORAGE

57.0			17.6	0
58.0	1	1.08	18.7	19
59.0	2	1.05	19.8	40
60.0	3	1.05	20.8	62
61.0	4	0.62	21.4	86
62	5	0.62	22.0	110
63	6	"	22.7	136
64	7	"	23.3	163
65	8	"	23.9	191
66	9	"	24.5	221
67	10	"	25.0	25

J. C. GAVILL 12/12/79

LOWER ACTNA DAM
STAGE-STORAGE CURVE



46 0706

BY LB DATE 12/18/70

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A-10 OF

CHKD. BY DATE

LOUIS BERGER & ASSOCIATES INC.

PROJECT C-2

SUBJECT IMPROVED DRAINAGE

1. NORMAL POOL STORMS ~ 100 AC-FT. (DATA)
2. DRAINAGE AREA 1.111 AC. LELV. 57.0 - SPILLWAY CREST
3. ASSUME INFILTRATION OF 10% / IN. = 6 cfs
4. DESIGN BOARDS TO ELEVATION:
5. OUTLET #2 - 51.3 OUTLET #1 - 53.55
 = UTILIZED FULL CULVERT FLOW
6. CULVERT #2 SIZE CULVERT #1 SIZE
 3.75' X 5.25' 4' H X 4.5'

7. DETERMINING AVE. RATE OF DRAINAGE OUTFLOW

SEE HYDRAULIC CHARTS FOR THE SELECTION OF PROPER CULVERTS
 (1) 2.5' X 5.25' H.C. R.C.P. CHART 1: FLOW OUTFLOW
 OUTLET #2 AVE. AVE. HEAD BETWEEN 51.0 & 51.3 = $51.15 / 2 = 2.55'$
 OUTLET #1 AVE. AVE. HEAD BETWEEN 51.0 & 53.55 = $34.5 / 2 = 1.77'$
 FROM FLOW CHARTS, THE ABOVE THROUGH EFFECT
 (1.77' INLET CULVERT)

 = 1.77' CULVERT #1 AVE. 1.77'
 HYDRAULIC CHART 1: FLOW OUTFLOW 7 cfs
 CULVERT #2 = 750 cfs THRU 7' X 5' 3.5' = 106 cfs
 8. AVE. RATE = 106 - 6 = 100 cfs

9. 100 / 8 FT = 12.5, 1000 SQ. FT.
10. DRAINAGE = $\frac{100 - 6}{100 - 6} = 12.1$ HOURS

BY L. B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A11 OF _____

CHKD. BY _____ DATE _____

MEDFORD LAKES DAM INSPECTION

PROJECT SE-46SUBJECT UPPER STOKES DAM

MEDFORD LAKES DAM INSPECTION - STOKES, STOCKWELL, UPPER & LOWER AETHA LAKES
BY L. B. GINES
MARCH, 1990

JOB SPECIFICATION

NO	NHR	NMIN	ICAT	INP	ININ	METC	IPLT	IPET	INSTAN
150	0	15	0	0	0	0	0	0	0
JOPEP					NUT				
3					0				

SUB-AREA RUNOFF COMPUTATION

INFLOW TO STOKES LAKE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JFRT	INAME
1	0	0	0	0	0	1

HYDROGRAPH DATA

INVOG	IBND	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNDU	ISAME	LOCAL
0	-1	1.55	0.00	1.55	0.00	0.000	0	0	0

PRECIP DATA

NP	STORM	DAY	DAY
24	0.00	0.00	0.00

PRECIP PATTERN

0.00	0.06	0.06	0.06	0.07	0.07	0.08	0.00	0.08	0.00
0.11	0.11	0.30	0.70	1.70	0.40	0.40	0.20	0.16	0.14
0.07	0.00	0.00	0.00						

LOSS DATA

STREP	ELTAR	RTIOL	ERRIN	STEPS	RTIOL	STRTL	CHCTL	ALSHX	FTIOP
0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.10	0.00	0.00

GIVEN UNIT GRAPH. NUMBO= 11

225	705	1039	741	475	297	170	105	45	39
25									

UNIT GRAPH TOTALS 4022. CFS OR 1.01 INCHES OVER THE AREA

RECESSION DATA

STRTQ=	0.00	OPRSH=	0.00	FTIOP=	1.00
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END-OF-PERIOD FLOW

TIME	RAIN	EXOS	CONF
1	0.00	0.00	0
2	0.06	0.00	0
3	0.06	0.00	0
4	0.06	0.00	0
5	0.07	0.00	0
6	0.07	0.00	0
7	0.06	0.00	0
8	0.00	0.04	0
9	0.00	0.00	43
10	0.00	0.00	103
11	0.11	0.08	166

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A12 OF _____

CHKD. BY _____ DATE _____

MEDFORD LAKES DAM INSPECTIONPROJECT C-246SUBJECT UPPER STOKES DAM

12	0.11	0.08	222
13	0.20	0.17	310
14	0.70	0.67	580
15	1.70	1.67	1235
16	0.40	0.38	2404
17	0.40	0.38	2830
18	0.20	0.18	2481
19	0.16	0.13	1914
20	0.14	0.12	1445
21	0.07	0.04	1060
22	0.06	0.03	763
23	0.06	0.03	537
24	0.06	0.03	379
25	0.06	0.03	270
26	0.00	0.00	164
27	0.00	0.00	100
28	0.00	0.00	55
29	0.00	0.00	31
30	0.00	0.00	17
31	0.00	0.00	8
32	0.00	0.00	5
33	0.00	0.00	2
34	0.00	0.00	1
35	0.00	0.00	0
36	0.00	0.00	0
37	0.00	0.00	0
38	0.00	0.00	0
39	0.00	0.00	0
40	0.00	0.00	0
41	0.00	0.00	0
42	0.00	0.00	0
43	0.00	0.00	0
44	0.00	0.00	0
45	0.00	0.00	0
46	0.00	0.00	0
47	0.00	0.00	0
48	0.00	0.00	0
49	0.00	0.00	0
50	0.00	0.00	0
51	0.00	0.00	0
52	0.00	0.00	0
53	0.00	0.00	0
54	0.00	0.00	0
55	0.00	0.00	0
56	0.00	0.00	0
57	0.00	0.00	0
58	0.00	0.00	0
59	0.00	0.00	0
60	0.00	0.00	0
61	0.00	0.00	0
62	0.00	0.00	0
63	0.00	0.00	0
64	0.00	0.00	0
65	0.00	0.00	0
66	0.00	0.00	0
67	0.00	0.00	0
68	0.00	0.00	0
69	0.00	0.00	0
70	0.00	0.00	0
71	0.00	0.00	0
72	0.00	0.00	0
73	0.00	0.00	0
74	0.00	0.00	0
75	0.00	0.00	0
76	0.00	0.00	0
77	0.00	0.00	0

78	0.00	0.00	0
79	0.00	0.00	0
80	0.00	0.00	0
81	0.00	0.00	0
82	0.00	0.00	0
83	0.00	0.00	0
84	0.00	0.00	0
85	0.00	0.00	0
86	0.00	0.00	0
87	0.00	0.00	0
88	0.00	0.00	0
89	0.00	0.00	0
90	0.00	0.00	0
91	0.00	0.00	0
92	0.00	0.00	0
93	0.00	0.00	0
94	0.00	0.00	0
95	0.00	0.00	0
96	0.00	0.00	0
97	0.00	0.00	0
98	0.00	0.00	0
99	0.00	0.00	0
100	0.00	0.00	0
101	0.00	0.00	0
102	0.00	0.00	0
103	0.00	0.00	0
104	0.00	0.00	0
105	0.00	0.00	0
106	0.00	0.00	0
107	0.00	0.00	0
108	0.00	0.00	0
109	0.00	0.00	0
110	0.00	0.00	0
111	0.00	0.00	0
112	0.00	0.00	0
113	0.00	0.00	0
114	0.00	0.00	0
115	0.00	0.00	0
116	0.00	0.00	0
117	0.00	0.00	0
118	0.00	0.00	0
119	0.00	0.00	0
120	0.00	0.00	0
121	0.00	0.00	0
122	0.00	0.00	0
123	0.00	0.00	0
124	0.00	0.00	0
125	0.00	0.00	0
126	0.00	0.00	0
127	0.00	0.00	0
128	0.00	0.00	0
129	0.00	0.00	0
130	0.00	0.00	0
131	0.00	0.00	0
132	0.00	0.00	0
133	0.00	0.00	0
134	0.00	0.00	0
135	0.00	0.00	0
136	0.00	0.00	0
137	0.00	0.00	0
138	0.00	0.00	0
139	0.00	0.00	0
140	0.00	0.00	0
141	0.00	0.00	0
142	0.00	0.00	0
143	0.00	0.00	0

SHEET NO. 113 OF

PROJECT C-246

PROJECT C-246

[illegible]

TIME FOR STOPPING FOR OUT

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SECRET

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33 5
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[illegible]

22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051

1	10	10	10
2	10	10	10
3	10	10	10
4	10	10	10
5	10	10	10
6	10	10	10
7	10	10	10
8	10	10	10
9	10	10	10
10	10	10	10
11	10	10	10
12	10	10	10
13	10	10	10
14	10	10	10
15	10	10	10
16	10	10	10
17	10	10	10
18	10	10	10
19	10	10	10
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22	10	10	10
23	10	10	10
24	10	10	10
25	10	10	10
26	10	10	10
27	10	10	10
28	10	10	10
29	10	10	10
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33	10	10	10
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37	10	10	10
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46	10	10	10
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62	10	10	10
63	10	10	10
64	10	10	10
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66	10	10	10
67	10	10	10
68	10	10	10
69	10	10	10
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73	10	10	10
74	10	10	10
75	10	10	10
76	10	10	10
77	10	10	10
78	10	10	10
79	10	10	10
80	10	10	10
81	10	10	10
82	10	10	10
83	10	10	10
84	10	10	10
85	10	10	10
86	10	10	10
87	10	10	10
88	10	10	10
89	10	10	10
90	10	10	10
91	10	10	10
92	10	10	10
93	10	10	10
94	10	10	10
95	10	10	10
96	10	10	10
97	10	10	10
98	10	10	10
99	10	10	10
100	10	10	10

[illegible]

1. 100
 2. 100
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 11. 100
 12. 100
 13. 100
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 25. 100
 26. 100
 27. 100
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101-69742

[illegible][illegible]

Figure 1

Figure 1. The effect of the number of trials on the number of correct responses. The number of correct responses was significantly higher for the 10-trial condition than for the 5-trial condition. Error bars represent the standard error of the mean.

[illegible][illegible]

17. 3

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1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

BY L.B. DATE _____
 CHKD. BY _____ DATE _____
 SUBJECT UPPER STOKES DAM

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 114 OF _____
 PROJECT MEAFORD LAKES DAM INSPECTION

32	16	6	47	94	1	0	2
33	15	3	44	99	1	0	2
34	14	2	40	100	1	0	2
35	13	0	37	101	1	0	2
36	12	0	34	102	1	0	2
37	12	0	31	103	1	0	1
38	11	0	27	104	1	0	1
39	11	0	23	105	1	0	1
40	10	0	24	106	1	0	1
41	10	0	22	107	1	0	1
42	9	0	21	108	1	0	1
43	9	0	19	109	1	0	1
44	8	0	17	110	1	0	1
45	8	0	16	111	1	0	1
46	8	0	15	112	1	0	1
47	7	0	15	113	0	0	1
48	7	0	14	114	0	0	1
49	7	0	14	115	0	0	1
50	6	0	13	116	0	0	1
51	6	0	12	117	0	0	1
52	6	0	12	118	0	0	1
53	6	0	11	119	0	0	1
54	5	0	11	120	0	0	1
55	5	0	11	121	0	0	1
56	5	0	10	122	0	0	1
57	5	0	10	123	0	0	1
58	5	0	9	124	0	0	1
59	4	0	9	125	0	0	1
60	4	0	9	126	0	0	1
61	4	0	8	127	0	0	1
62	4	0	8	128	0	0	1
63	4	0	8	129	0	0	0
64	4	0	7	130	0	0	0
65	3	0	7	131	0	0	0
66	3	0	7	132	0	0	0
67	3	0	6	133	0	0	0
68	3	0	6	134	0	0	0
69	3	0	6	135	0	0	0
70	3	0	6	136	0	0	0
71	3	0	5	137	0	0	0
72	3	0	5	138	0	0	0
73	3	0	5	139	0	0	0
74	2	0	5	140	0	0	0
75	2	0	5	141	0	0	0
76	2	0	4	142	0	0	0
77	2	0	4	143	0	0	0
78	2	0	4	144	0	0	0
79	2	0	4	145	0	0	0
80	2	0	4	146	0	0	0
81	2	0	4	147	0	0	0
82	2	0	3	148	0	0	0
83	2	0	3	149	0	0	0
84	2	0	3	150	0	0	0
85	2	0	3				
86	1	0	3				
87	1	0	3				
88	1	0	3				
89	1	0	3				
90	1	0	2				
91	1	0	2				
92	1	0	2				
93	1	0	2				
94	1	0	2				
95	1	0	2				
96	1	0	2				
97	1	0	2				

SUM

17234

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
2657	602	179	111	17234
INCHES	4.16	4.30	4.31	4.31
PC-FT	344	350	350	356

SUB-AREA RUNOFF COMPUTATION

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A15 OF _____

CHKD. BY _____ DATE _____

MEASURED LAKE STOCKWELL DAM INFILTRATIONPROJECT C-246SUBJECT LAKE STOCKWELL DAM

INFLOW TO LAKE STOCKWELL

ISTAR	ICOMP	IECON	ITRPE	JPLT	JPRT	INAME
2	0	0	0	0	0	1

HYDROGRAPH DATA

THYDG	THUG	TAREA	SNAP	TPSDA	TPSPD	PATIO	ISHOW	ISAME	LOCAL
0	-1	3.50	0.00	3.50	0.00	0.000	0	0	0

PRECIP DATA

NP	STORM	DAJ	DAK
24	0.00	0.00	0.00

PRECIP PATTERN

0.00	0.06	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.09
0.11	0.11	0.30	0.70	1.70	0.40	0.40	0.20	0.16	0.14
0.07	0.06	0.06	0.06						

LOSS DATA

STRKR	DLTR	RTIOL	EPAIN	STPKS	RTIOK	STRTL	CHSTL	ALSMX	RTIMP
0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.10	0.00	0.00

GIVEN UNIT GRAPH, HUNGQ= 19

116	436	916	1293	1408	1250	984	709	534	402
299	210	157	117	83	65	48	37	25	

UNIT GRAPH TOTALS 31.00 CFS OR 1.01 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 OFCSH= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP
1	0.06	0.00	0.
2	0.06	0.00	0.
3	0.06	0.00	0.
4	0.06	0.00	0.
5	0.07	0.00	0.
6	0.07	0.00	0.
7	0.08	0.00	0.
8	0.09	0.04	4.
9	0.09	0.07	23.
10	0.09	0.07	69.
11	0.11	0.08	144.
12	0.11	0.08	241.
13	0.30	0.27	368.
14	0.70	0.67	594.
15	1.70	1.67	1141.
16	0.40	0.38	2103.
17	0.40	0.38	3286.
18	0.20	0.18	4203.
19	0.16	0.13	4552.
20	0.14	0.12	4317.
21	0.07	0.04	3764.
22	0.06	0.03	3111.
23	0.06	0.03	2543.
24	0.06	0.03	2048.
25	0.00	0.00	1624.
26	0.00	0.00	1267.
27	0.00	0.00	979.
28	0.00	0.00	749.
29	0.00	0.00	564.
30	0.00	0.00	412.
31	0.00	0.00	307.
32	0.00	0.00	223.
33	0.00	0.00	150.
34	0.00	0.00	79.
35	0.00	0.00	51.

BY L.B. DATE _____

CHKD. BY _____ DATE _____

SUBJECT LAKE STOCKNEEL DAM

LOUIS BERGER & ASSOCIATES INC.

MEDFORD LAKES DAM INSPECTION

SHEET NO. 116 OF _____

PROJECT C-246

36	0.00	0.00	30
37	0.00	0.00	19
38	0.00	0.00	12
39	0.00	0.00	6
40	0.00	0.00	4
41	0.00	0.00	2
42	0.00	0.00	1
43	0.00	0.00	0
44	0.00	0.00	0
45	0.00	0.00	0
46	0.00	0.00	0
47	0.00	0.00	0
48	0.00	0.00	0
49	0.00	0.00	0
50	0.00	0.00	0
51	0.00	0.00	0
52	0.00	0.00	0
53	0.00	0.00	0
54	0.00	0.00	0
55	0.00	0.00	0
56	0.00	0.00	0
57	0.00	0.00	0
58	0.00	0.00	0
59	0.00	0.00	0
60	0.00	0.00	0
61	0.00	0.00	0
62	0.00	0.00	0
63	0.00	0.00	0
64	0.00	0.00	0
65	0.00	0.00	0
66	0.00	0.00	0
67	0.00	0.00	0
68	0.00	0.00	0
69	0.00	0.00	0
70	0.00	0.00	0
71	0.00	0.00	0
72	0.00	0.00	0
73	0.00	0.00	0
74	0.00	0.00	0
75	0.00	0.00	0
76	0.00	0.00	0
77	0.00	0.00	0
78	0.00	0.00	0
79	0.00	0.00	0
80	0.00	0.00	0
81	0.00	0.00	0
82	0.00	0.00	0
83	0.00	0.00	0
84	0.00	0.00	0
85	0.00	0.00	0
86	0.00	0.00	0
87	0.00	0.00	0
88	0.00	0.00	0
89	0.00	0.00	0
90	0.00	0.00	0
91	0.00	0.00	0
92	0.00	0.00	0
93	0.00	0.00	0
94	0.00	0.00	0
95	0.00	0.00	0
96	0.00	0.00	0
97	0.00	0.00	0
98	0.00	0.00	0
99	0.00	0.00	0
100	0.00	0.00	0
101	0.00	0.00	0

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A17 OF _____

CHKD. BY _____ DATE _____

MEDEFORD LAKES DAM INSPECTION

PROJECT C-246

SUBJECT LAKE STOCKWELL DAM

102	0.00	0.00	0.
103	0.00	0.00	0.
104	0.00	0.00	0.
105	0.00	0.00	0.
106	0.00	0.00	0.
107	0.00	0.00	0.
108	0.00	0.00	0.
109	0.00	0.00	0.
110	0.00	0.00	0.
111	0.00	0.00	0.
112	0.00	0.00	0.
113	0.00	0.00	0.
114	0.00	0.00	0.
115	0.00	0.00	0.
116	0.00	0.00	0.
117	0.00	0.00	0.
118	0.00	0.00	0.
119	0.00	0.00	0.
120	0.00	0.00	0.
121	0.00	0.00	0.
122	0.00	0.00	0.
123	0.00	0.00	0.
124	0.00	0.00	0.
125	0.00	0.00	0.
126	0.00	0.00	0.
127	0.00	0.00	0.
128	0.00	0.00	0.
129	0.00	0.00	0.
130	0.00	0.00	0.
131	0.00	0.00	0.
132	0.00	0.00	0.
133	0.00	0.00	0.
134	0.00	0.00	0.
135	0.00	0.00	0.
136	0.00	0.00	0.
137	0.00	0.00	0.
138	0.00	0.00	0.
139	0.00	0.00	0.
140	0.00	0.00	0.
141	0.00	0.00	0.
142	0.00	0.00	0.
143	0.00	0.00	0.
144	0.00	0.00	0.
145	0.00	0.00	0.
146	0.00	0.00	0.
147	0.00	0.00	0.
148	0.00	0.00	0.
149	0.00	0.00	0.
150	0.00	0.00	0.

SUM 5.20 4.27 39001.

	PERF	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4552	1010	400	200	39004
INCHES		4.29	4.32	4.32	4.32
AC-FT		202	800	800	800

COMBINE HYDROGRAPHS

COMBINE ROUTED HYD	STOKES DAM 1	INFLOW HYD.	TO STOCKWELL			
10TAD	100MP	100MP	10TAD	10TAD	10TAD	10TAD
22	2	0	0	0	0	1

SHEET NO. 118 OF

PROJECT C-44

PROJECT C-296

我手書女子英學書

六、大英一千九百零七年

Figure 1

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 10

- 77304515 EARL HENRICH, SR.; 11/19/68

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BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A19 OF _____

CHKD. BY _____ DATE _____

MEDFORD LAKES DAM INSPECTIONPROJECT C-246SUBJECT LAKE STOCKHILL DAM

23	316	3642	4552
24	289	2905	3923
25	261	2337	3099
26	236	1766	2729
27	212	1338	2236
28	191	1009	1609
29	173	739	1426
30	157	548	1180
31	144	415	903
32	132	314	784
33	122	232	670
34	114	157	507
35	106	104	458
36	99	76	411
37	92	58	363
38	85	45	329
39	80	37	293
40	75	30	261
41	70	26	232
42	66	23	206
43	62	20	191
44	59	18	177
45	56	17	164
46	53	16	152
47	50	15	140
48	48	14	130
49	45	14	121
50	43	13	112
51	41	13	104
52	39	12	96
53	38	12	89
54	36	11	83
55	35	11	77
56	33	10	72
57	32	10	66
58	31	10	62
59	30	9	58
60	29	9	54
61	28	8	50
62	27	8	48
63	27	8	46
64	26	7	45
65	25	7	44
66	24	7	42
67	24	7	41
68	23	6	40
69	22	6	39
70	21	6	38
71	21	6	36
72	20	5	35
73	20	5	34
74	19	5	33
75	18	5	32
76	18	5	31
77	17	4	30
78	17	4	29
79	16	4	28
80	16	4	26
81	15	4	27
82	15	4	26
83	14	3	25
84	14	3	24
85	13	3	24
86	13	3	23
87	12	3	22
88	12	3	21

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A20 OF _____

CHKD. BY _____ DATE _____ MEDFORD LAKES DAM INSPECTION _____

PROJECT C-241

SUBJECT LAKE STOCKWELL DAM

87	12	3	21
88	11	3	19
89	11	2	19
90	11	2	19
91	10	2	18
92	10	2	18
93	10	2	17
94	9	2	17
95	8	2	16
96	9	2	16
97	9	2	15
98	8	2	15
99	8	2	14
100	8	2	14
101	8	1	13
102	7	1	13
103	7	1	12
104	7	1	12
105	7	1	12
106	6	1	11
107	6	1	11
108	6	1	11
109	6	1	10
110	6	1	10
111	5	1	9
112	5	1	9
113	5	1	8
114	5	1	8
115	5	1	8
116	4	1	7
117	4	1	7
118	4	1	7
119	4	1	6
120	4	1	6
121	4	1	6
122	4	1	6
123	4	1	6
124	4	1	6
125	4	1	6
126	3	1	5
127	3	1	5
128	3	1	5
129	3	0	5
130	3	0	5
131	3	0	5
132	3	0	5
133	3	0	5
134	3	0	5
135	3	0	5
136	3	0	5
137	2	0	4
138	2	0	4
139	2	0	4
140	2	0	4
141	2	0	4
142	2	0	4
143	2	0	4
144	2	0	3
145	2	0	3
146	2	0	3
147	2	0	3
148	2	0	3
149	2	0	3
150	2	0	3

100

50161

PEAK	6-HOUR	24-HOUR	32-HOUR	TOTAL VOLUME
5378	2157	582	374	50161
	3.47	4.27	4.31	4.31
	10.0	11.5	11.0	11.0

40.0

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A21 OF _____

CHKD. BY _____ DATE _____

MEDFORD LAKES DAM INSPECTION

PROJECT C-240SUBJECT UPPER AETHA LAKE

SUB-AREA FUNDING COMPUTATION

INFLUX TO UPPER WITHIN LAKE - FUND FROM STORES AND STOCKS

INFLUX	INFLUX	INFLUX	INFLUX	INFLUX	INFLUX	INFLUX
3	0	0	0	0	0	1

HYDROGRAPH DATA

INFLUX	INFLUX	TAKEN	ENHP	INFLUX	INFLUX	RATIO	INFLUX	INFLUX	LOCAL
0	-1	0.40	0.00	0.40	0.00	0.000	0	0	0

PRECIP DATA

STORM	ONJ	DAK
24	0.00	0.00

PRECIP PATTERN

0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.11	0.11	0.30	0.30	1.20	0.40	0.40	0.20	0.10	0.10
0.02	0.00	0.00	0.00						

LOSS DATA

STORM	OUTER	RTIO	ENHP	STORM	RTIO	STRT	CHSTL	ALSHD	RTIO
0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.10	0.00	0.00

GIVEN UNIT GRAPH, HURCO= 9

87. 293 325 214 114 71 40 24 13

UNIT GRAPH TOTALS 1192. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRT= 0.00 ORSH= 0.00 RTIO= 1.00

END-OF-PERIOD FLOW

TIME	PRIN	ENHP	COMP
1	0.00	0.00	0
2	0.00	0.00	0
3	0.00	0.00	0
4	0.00	0.00	0
5	0.00	0.00	0
6	0.00	0.00	0
7	0.00	0.00	0
8	0.00	0.04	3
9	0.00	0.07	14
10	0.00	0.07	36
11	0.11	0.00	55
12	0.11	0.00	72
13	0.20	0.27	101
14	0.20	0.67	150
15	1.20	1.67	470
16	0.40	0.39	827
17	0.30	0.70	878
18	0.20	0.10	717
19	0.10	0.10	531
20	0.14	0.12	380
21	0.07	0.04	270
22	0.00	0.00	170
23	0.00	0.00	123
24	0.00	0.00	79
25	0.00	0.00	57
26	0.00	0.00	30
27	0.00	0.00	21

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 122 OF _____

CHKD. BY _____ DATE _____

MEQUINON LAKES DAM INSPECTION

PROJECT 613116

SUBJECT UPPER ARTHA LAKE

28	0.00	0.00	11
29	0.00	0.00	5
30	0.00	0.00	3
31	0.00	0.00	1
32	0.00	0.00	0
33	0.00	0.00	0
34	0.00	0.00	0
35	0.00	0.00	0
36	0.00	0.00	0
37	0.00	0.00	0
38	0.00	0.00	0
39	0.00	0.00	0
40	0.00	0.00	0
41	0.00	0.00	0
42	0.00	0.00	0
43	0.00	0.00	0
44	0.00	0.00	0
45	0.00	0.00	0
46	0.00	0.00	0
47	0.00	0.00	0
48	0.00	0.00	0
49	0.00	0.00	0
50	0.00	0.00	0
51	0.00	0.00	0
52	0.00	0.00	0
53	0.00	0.00	0
54	0.00	0.00	0
55	0.00	0.00	0
56	0.00	0.00	0
57	0.00	0.00	0
58	0.00	0.00	0
59	0.00	0.00	0
60	0.00	0.00	0
61	0.00	0.00	0
62	0.00	0.00	0
63	0.00	0.00	0
64	0.00	0.00	0
65	0.00	0.00	0
66	0.00	0.00	0
67	0.00	0.00	0
68	0.00	0.00	0
69	0.00	0.00	0
70	0.00	0.00	0
71	0.00	0.00	0
72	0.00	0.00	0
73	0.00	0.00	0
74	0.00	0.00	0
75	0.00	0.00	0
76	0.00	0.00	0
77	0.00	0.00	0
78	0.00	0.00	0
79	0.00	0.00	0
80	0.00	0.00	0
81	0.00	0.00	0
82	0.00	0.00	0
83	0.00	0.00	0
84	0.00	0.00	0
85	0.00	0.00	0
86	0.00	0.00	0
87	0.00	0.00	0
88	0.00	0.00	0
89	0.00	0.00	0
90	0.00	0.00	0
91	0.00	0.00	0
92	0.00	0.00	0
93	0.00	0.00	0

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A23 OF _____

CHKD. BY _____ DATE _____

MELFORD LAKES DAM INSPECTION

PROJECT C-246

SUBJECT UPPER AETNA LAKE

94	0.00	0.00	0
95	0.00	0.00	0
96	0.00	0.00	0
97	0.00	0.00	0
98	0.00	0.00	0
99	0.00	0.00	0
100	0.00	0.00	0
101	0.00	0.00	0
102	0.00	0.00	0
103	0.00	0.00	0
104	0.00	0.00	0
105	0.00	0.00	0
106	0.00	0.00	0
107	0.00	0.00	0
108	0.00	0.00	0
109	0.00	0.00	0
110	0.00	0.00	0
111	0.00	0.00	0
112	0.00	0.00	0
113	0.00	0.00	0
114	0.00	0.00	0
115	0.00	0.00	0
116	0.00	0.00	0
117	0.00	0.00	0
118	0.00	0.00	0
119	0.00	0.00	0
120	0.00	0.00	0
121	0.00	0.00	0
122	0.00	0.00	0
123	0.00	0.00	0
124	0.00	0.00	0
125	0.00	0.00	0
126	0.00	0.00	0
127	0.00	0.00	0
128	0.00	0.00	0
129	0.00	0.00	0
130	0.00	0.00	0
131	0.00	0.00	0
132	0.00	0.00	0
133	0.00	0.00	0
134	0.00	0.00	0
135	0.00	0.00	0
136	0.00	0.00	0
137	0.00	0.00	0
138	0.00	0.00	0
139	0.00	0.00	0
140	0.00	0.00	0
141	0.00	0.00	0
142	0.00	0.00	0
143	0.00	0.00	0
144	0.00	0.00	0
145	0.00	0.00	0
146	0.00	0.00	0
147	0.00	0.00	0
148	0.00	0.00	0
149	0.00	0.00	0
150	0.00	0.00	0

SUB 5.10 4.27 510.8

	FEW	6-10	24-40	72-100	TOTAL VOLUME
CFS	87.5	113	55	34	510.8
INCHES		4.50	4.70	4.50	4.50
FOOT		10	10	10	10

BY L.B. DATE _____

CHKD. BY _____ DATE _____

SUBJECT UPPER AETNA LAKE DAM

LOUIS BERGER & ASSOCIATES INC.

MEDFORD LAKES DAM INSPECTION

SHEET NO. A24 OF _____

PROJECT C-246

COMBINE HYDROGRAPHS

COMBINE ROUTED HYDROGRAPH STOCKWELL DAM & INFLOW HYD T

TIME	INFLW	REGN	ITRPE	JFLT	JFPT	INAME
0	0	0	0	0	0	1
1	0	0	0	0	0	1
2	0	0	0	0	0	1
3	0	0	0	0	0	1
4	0	0	0	0	0	1
5	0	0	0	0	0	1
6	0	0	0	0	0	1
7	0	0	0	0	0	1
8	0	0	0	0	0	1
9	0	0	0	0	0	1
10	0	0	0	0	0	1
11	0	0	0	0	0	1
12	0	0	0	0	0	1
13	0	0	0	0	0	1
14	0	0	0	0	0	1
15	0	0	0	0	0	1
16	0	0	0	0	0	1
17	0	0	0	0	0	1
18	0	0	0	0	0	1
19	0	0	0	0	0	1
20	0	0	0	0	0	1
21	0	0	0	0	0	1
22	0	0	0	0	0	1
23	0	0	0	0	0	1
24	0	0	0	0	0	1
25	0	0	0	0	0	1
26	0	0	0	0	0	1
27	0	0	0	0	0	1
28	0	0	0	0	0	1
29	0	0	0	0	0	1
30	0	0	0	0	0	1
31	0	0	0	0	0	1
32	0	0	0	0	0	1
33	0	0	0	0	0	1
34	0	0	0	0	0	1
35	0	0	0	0	0	1
36	0	0	0	0	0	1
37	0	0	0	0	0	1
38	0	0	0	0	0	1
39	0	0	0	0	0	1
40	0	0	0	0	0	1
41	0	0	0	0	0	1
42	0	0	0	0	0	1
43	0	0	0	0	0	1
44	0	0	0	0	0	1
45	0	0	0	0	0	1
46	0	0	0	0	0	1
47	0	0	0	0	0	1
48	0	0	0	0	0	1
49	0	0	0	0	0	1
50	0	0	0	0	0	1
51	0	0	0	0	0	1
52	0	0	0	0	0	1
53	0	0	0	0	0	1
54	0	0	0	0	0	1
55	0	0	0	0	0	1
56	0	0	0	0	0	1
57	0	0	0	0	0	1
58	0	0	0	0	0	1
59	0	0	0	0	0	1
60	0	0	0	0	0	1
61	0	0	0	0	0	1
62	0	0	0	0	0	1
63	0	0	0	0	0	1
64	0	0	0	0	0	1
65	0	0	0	0	0	1
66	0	0	0	0	0	1
67	0	0	0	0	0	1
68	0	0	0	0	0	1
69	0	0	0	0	0	1
70	0	0	0	0	0	1
71	0	0	0	0	0	1
72	0	0	0	0	0	1
73	0	0	0	0	0	1
74	0	0	0	0	0	1
75	0	0	0	0	0	1
76	0	0	0	0	0	1
77	0	0	0	0	0	1
78	0	0	0	0	0	1
79	0	0	0	0	0	1
80	0	0	0	0	0	1
81	0	0	0	0	0	1
82	0	0	0	0	0	1
83	0	0	0	0	0	1
84	0	0	0	0	0	1
85	0	0	0	0	0	1
86	0	0	0	0	0	1
87	0	0	0	0	0	1
88	0	0	0	0	0	1
89	0	0	0	0	0	1
90	0	0	0	0	0	1
91	0	0	0	0	0	1
92	0	0	0	0	0	1
93	0	0	0	0	0	1
94	0	0	0	0	0	1
95	0	0	0	0	0	1
96	0	0	0	0	0	1
97	0	0	0	0	0	1
98	0	0	0	0	0	1
99	0	0	0	0	0	1
100	0	0	0	0	0	1

PEAK 5678
CFS 5678
INCHES 5678
FEET 5678

HYDROGRAPH ROUTING

ROUTING THROUGH UPPER AETNA LAKE

ROUTING DATA

STOP-GE 0 27 105
OUTFLOW 0 105

TIME EDP STOP AVG IN EDP OUT

329. 404. 485
8548. 11047. 13753

BY L. B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A25 OF _____

CHKD. BY _____ DATE _____

MEDARD LAKES DAM INSPECTION

PROJECT C-241SUBJECT UPPER AETNA LAKE DAM

15	16	428	42	81	12	27	48
16	33	944	144	82	12	26	46
17	67	1904	452	83	12	25	45
18	114	3303	1568	84	11	25	43
19	162	4642	3012	85	11	24	42
20	200	5443	4222	86	10	23	40
21	232	5603	4750	87	10	22	39
22	270	5464	5216	88	10	22	38
23	226	4975	5043	89	9	21	36
24	215	4341	4713	90	9	20	35
25	199	3679	4186	91	9	20	34
26	181	3059	3625	92	8	19	33
27	164	2503	3070	93	8	19	32
28	148	2024	2554	94	8	18	31
29	133	1621	2130	95	8	17	30
30	120	1307	1753	96	7	17	29
31	109	1075	1449	97	7	16	28
32	100	876	1191	98	7	16	27
33	92	707	1010	99	7	15	26
34	84	568	845	100	6	15	25
35	78	453	710	101	6	14	24
36	74	435	697	102	6	14	23
37	70	390	526	103	6	13	23
38	67	348	459	104	6	13	22
39	64	311	404	105	5	13	21
40	62	277	356	106	5	12	20
41	60	246	315	107	5	12	20
42	59	219	297	108	5	11	19
43	57	199	285	109	5	11	19
44	55	184	273	110	5	11	18
45	53	170	261	111	4	10	17
46	51	153	249	112	4	10	17
47	49	146	237	113	4	10	16
48	47	135	225	114	4	9	16
49	45	125	213	115	4	9	15
50	43	116	202	116	4	9	15
51	41	108	191	117	4	9	14
52	39	100	180	118	4	8	14
53	38	93	170	119	3	8	13
54	36	86	160	120	3	8	13
55	35	80	150	121	3	8	13
56	33	74	141	122	3	7	12
57	32	69	133	123	3	7	12
58	30	64	125	124	3	7	11
59	29	60	117	125	3	7	11
60	28	56	110	126	3	6	11
61	27	52	104	127	3	6	10
62	26	49	99	128	3	6	10
63	25	47	95	129	2	6	10
64	24	46	92	130	2	6	9
65	23	44	88	131	2	5	9
66	22	43	84	132	2	5	9
67	21	42	81	133	2	5	8
68	20	41	78	134	2	5	8
69	19	39	75	135	2	5	8
70	19	39	72	136	2	5	8
71	18	37	69	137	2	4	7
72	17	36	67	138	2	4	7
73	17	35	64	139	2	4	7
74	16	34	61	140	2	4	7
75	15	33	60	141	2	4	6
76	15	32	58	142	2	4	6
77	14	31	56	143	2	4	6
78	14	30	54	144	2	4	6
79	13	29	52	145	1	3	5
80	13	28	50	146	1	3	5

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 126 OF _____

CHKD. BY _____ DATE _____ MEDFORD LAKES DAM INSPECTION _____

PROJECT C-246

SUBJECT UPPER AETNA LAKE

147	1	3	5
148	1	3	5
149	1	3	5
150	1	3	5

SUM 61211

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5216	2255	633	408	61211
INCHES	3.51	4.27	4.31	4.31	
AC-FT	1119	1056	1265	1265	

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 27 OF _____

CHKD. BY _____ DATE _____

MEDFORD LAKES DAM INSPECTION

PROJECT C-246SUBJECT LOWER AETNA LAKE

SUB-AREA RUNOFF COMPUTATION

INFLOW TO LOWER AETNA LAKE - (NOT FROM STOKES, STOCKMEL)									
ISTAG	ICOMP	IECON	ITAPE	JPLT	JFRT	INAME			
4	0	0	0	0	0	1			
HYDROGRAPH DATA									
IHYG	IUNG	TAREH	SNAP	IPEDW	TASPC	RATIO	ISHOW	ISAME	LOCAL
0	-1	0.48	0.00	0.48	0.00	0.000	0	0	0
PRECIP DATA									
HP	STORM	DAY	DAK						
24	0.00	0.00	0.00	PRECIP PATTERN					
0.06	0.06	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.09
0.11	0.11	0.30	0.70	1.70	0.40	0.40	0.20	0.16	0.14
0.07	0.06	0.06	0.06						
LOSS DATA									
STEPR	DLTKR	RTIOL	ERRIN	STEPS	RTIOK	STRIL	CHSTL	ALSHX	PTIMP
0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.10	0.00	0.00

GIVEN UNIT GRAPH, NUMGO= 7
 304 510 245 109 46 20 9
 UNIT GRAPH TOTALS 1243 CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA
 STRIO= 0.00 OFOSR= 0.00 RTIOP= 1.00

END-OF-PERIOD FLOW			
TIME	RAIN	EXCS	COMP 0
1	0.06	0.00	0.
2	0.06	0.00	0.
3	0.06	0.00	0.
4	0.06	0.00	0.
5	0.07	0.00	0.
6	0.07	0.00	0.
7	0.08	0.00	0.
8	0.09	0.04	11.
9	0.09	0.07	38.
10	0.09	0.07	62.
11	0.11	0.09	79.
12	0.11	0.09	94.
13	0.30	0.27	150.
14	0.70	0.67	380.
15	1.70	1.67	936.
16	0.40	0.38	1170.
17	0.40	0.38	804.
18	0.20	0.18	556.
19	0.16	0.13	356.

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 28 OF _____CHKD. BY _____ DATE _____ MEGGER LAKES DAM INSPECTIONPROJECT C-246SUBJECT LOWER AETNA LAKE

20	0.14	0.12	244	80	0.00	0.00	0
21	0.07	0.04	164	87	0.00	0.00	0
22	0.00	0.03	95	88	0.00	0.00	0
23	0.06	0.03	65	89	0.00	0.00	0
24	0.06	0.03	52	90	0.00	0.00	0
25	0.00	0.00	36	91	0.00	0.00	0
26	0.00	0.00	16	92	0.00	0.00	0
27	0.00	0.00	7	93	0.00	0.00	0
28	0.00	0.00	3	94	0.00	0.00	0
29	0.00	0.00	1	95	0.00	0.00	0
30	0.00	0.00	0	96	0.00	0.00	0
31	0.00	0.00	0	97	0.00	0.00	0
32	0.00	0.00	0	98	0.00	0.00	0
33	0.00	0.00	0	99	0.00	0.00	0
34	0.00	0.00	0	100	0.00	0.00	0
35	0.00	0.00	0	101	0.00	0.00	0
36	0.00	0.00	0	102	0.00	0.00	0
37	0.00	0.00	0	103	0.00	0.00	0
38	0.00	0.00	0	104	0.00	0.00	0
39	0.00	0.00	0	105	0.00	0.00	0
40	0.00	0.00	0	106	0.00	0.00	0
41	0.00	0.00	0	107	0.00	0.00	0
42	0.00	0.00	0	108	0.00	0.00	0
43	0.00	0.00	0	109	0.00	0.00	0
44	0.00	0.00	0	110	0.00	0.00	0
45	0.00	0.00	0	111	0.00	0.00	0
46	0.00	0.00	0	112	0.00	0.00	0
47	0.00	0.00	0	113	0.00	0.00	0
48	0.00	0.00	0	114	0.00	0.00	0
49	0.00	0.00	0	115	0.00	0.00	0
50	0.00	0.00	0	116	0.00	0.00	0
51	0.00	0.00	0	117	0.00	0.00	0
52	0.00	0.00	0	118	0.00	0.00	0
53	0.00	0.00	0	119	0.00	0.00	0
54	0.00	0.00	0	120	0.00	0.00	0
55	0.00	0.00	0	121	0.00	0.00	0
56	0.00	0.00	0	122	0.00	0.00	0
57	0.00	0.00	0	123	0.00	0.00	0
58	0.00	0.00	0	124	0.00	0.00	0
59	0.00	0.00	0	125	0.00	0.00	0
60	0.00	0.00	0	126	0.00	0.00	0
61	0.00	0.00	0	127	0.00	0.00	0
62	0.00	0.00	0	128	0.00	0.00	0
63	0.00	0.00	0	129	0.00	0.00	0
64	0.00	0.00	0	130	0.00	0.00	0
65	0.00	0.00	0	131	0.00	0.00	0
66	0.00	0.00	0	132	0.00	0.00	0
67	0.00	0.00	0	133	0.00	0.00	0
68	0.00	0.00	0	134	0.00	0.00	0
69	0.00	0.00	0	135	0.00	0.00	0
70	0.00	0.00	0	136	0.00	0.00	0
71	0.00	0.00	0	137	0.00	0.00	0
72	0.00	0.00	0	138	0.00	0.00	0
73	0.00	0.00	0	139	0.00	0.00	0
74	0.00	0.00	0	140	0.00	0.00	0
75	0.00	0.00	0	141	0.00	0.00	0
76	0.00	0.00	0	142	0.00	0.00	0
77	0.00	0.00	0	143	0.00	0.00	0
78	0.00	0.00	0	144	0.00	0.00	0
79	0.00	0.00	0	145	0.00	0.00	0
80	0.00	0.00	0	146	0.00	0.00	0
81	0.00	0.00	0	147	0.00	0.00	0
82	0.00	0.00	0	148	0.00	0.00	0
83	0.00	0.00	0	149	0.00	0.00	0
84	0.00	0.00	0	150	0.00	0.00	0
85	0.00	0.00	0				

BY L.B. DATE

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 23 OF

CHKD. BY DATE

MEDEORD LAKES DAM INSPECTION

PROJECT C-246

SUBJECT LOWER AETNA LAKE

		SUM	5.20	4 27	5328	
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME	
CFS	1170	222	55	30	5328	
INCHES		4 30	4 30	4 30	4 30	
AC-FT		110	110	110	110	

COMBINE HYDROGRAPHS

COMBINE ROUTED HYDROGRAPH UPPER AETNA DAM & INFLOW HYD.

ISTHR ICOMP IECON ITMPE JPLT JFRT INAME

44 2 0 0 0 0 1

SUM OF 2 HYDROGRAPHS RT 44

0	0	0	0	0	0	0	11	39	65
85	100	178	412	993	1314	1256	2142	3303	4426
5123	5711	5150	4761	4222	3641	3678	2557	2131	1758
1443	1121	1010	845	710	607	526	450	404	356
315	277	285	273	261	249	237	225	213	202
191	180	170	160	150	141	133	125	117	110
104	99	95	92	83	84	81	76	75	72
69	67	64	62	60	53	56	54	52	50
43	38	45	43	42	40	39	38	36	35
34	30	32	31	30	29	28	27	26	25
24	23	23	22	21	20	20	19	19	18
17	17	16	16	15	15	14	14	13	13
13	12	12	11	11	11	10	10	10	9
9	9	8	8	8	8	7	7	7	7
6	6	6	6	6	5	5	5	5	5

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME	
CFS	5311	2420	602	444	66530	
INCHES		3 76	4 27	4 31	4 31	
AC-FT		1201	1305	1375	1375	

HYDROGRAPH ROUTING

ROUTING THROUGH LOWER AETNA LAKE

ISTHR ICOMP IECON ITMPE JPLT JFRT INAME

444 1 0 0 0 0 1

ROUTING DATA

OLOSS CLOSS AVG IRES ISAME

0.0 0.000 0.00 1 0

NSTPS NSTOL LAG AMSEL X TCK STOPA

1 0 0 0.000 0.000 0.000 0

STORAGE=	0	19	40	62	86	110	136	163	191	221
OUTFLOW=	0	32	90	150	187	265	2075	3675	5474	7551

TIME	EQP STOP	AVG IN	EQP OUT
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0

BY L.J.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 30 OF _____

CHKD. BY _____ DATE _____ MEDFORD LAKES DAM INSPECTION _____

PROJECT C-248SUBJECT LOWER ACTINA LAKE

7	0	0	0	72	59	66	141
8	0	6	0	74	57	63	137
9	1	25	1	75	56	61	133
10	2	52	3	76	54	59	129
11	3	75	5	77	53	57	125
12	5	96	8	78	51	55	121
13	6	142	13	79	50	53	117
14	13	295	23	80	49	51	114
15	27	705	55	81	47	49	110
16	49	1156	115	82	46	47	107
17	73	1285	167	83	45	46	103
18	100	1639	589	84	44	44	100
19	132	2755	1875	85	43	42	97
20	156	3917	3371	86	41	41	94
21	176	4794	4500	87	40	40	91
22	195	5217	5080	88	39	38	88
23	197	5235	5205	89	38	37	85
24	184	4560	5007	90	37	36	82
25	173	4492	4590	91	36	34	80
26	169	3931	4058	92	35	33	77
27	161	3359	3503	93	34	32	75
28	152	2817	2990	94	34	31	72
29	143	2344	2507	95	33	30	70
30	136	1944	2086	96	32	29	68
31	129	1664	1771	97	31	28	65
32	123	1320	1476	98	30	27	63
33	118	1100	1233	99	30	26	61
34	114	928	1035	100	29	25	59
35	110	777	868	101	28	25	57
36	107	658	772	102	28	24	55
37	103	566	675	103	27	23	54
38	100	493	595	104	26	22	52
39	98	432	521	105	26	22	50
40	96	380	457	106	25	21	49
41	94	336	403	107	24	20	47
42	92	306	359	108	24	19	46
43	91	291	328	109	23	19	44
44	90	279	306	110	23	18	43
45	90	267	289	111	22	18	41
46	89	255	274	112	22	17	40
47	89	243	260	113	21	17	39
48	88	231	247	114	21	16	37
49	88	219	234	115	20	15	36
50	87	209	222	116	20	15	35
51	87	196	210	117	20	14	34
52	86	185	199	118	19	14	33
53	86	175	188	119	19	14	32
54	86	165	186	120	18	13	31
55	85	155	185	121	18	13	31
56	84	146	184	122	18	12	30
57	83	137	183	123	17	12	29
58	82	129	181	124	17	12	29
59	81	121	179	125	17	11	28
60	80	114	177	126	16	11	27
61	78	107	175	127	16	10	27
62	77	102	173	128	16	10	26
63	75	97	170	129	15	10	26
64	74	94	168	130	15	9	25
65	72	90	165	131	15	9	25
66	70	86	163	132	14	9	24
67	69	83	160	133	14	9	24
68	67	80	159	134	14	8	23
69	65	77	156	135	13	9	23
70	64	74	153	136	13	8	22
71	62	71	150	137	13	8	22
72	60	68	146	138	12	7	21

BY L.B. DATE _____

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 31 OF _____

CHKD. BY _____ DATE _____

MEDFORD DAM INSPECTIONPROJECT C-244SUBJECT LOWER AETNA LAKE

138	12.	7.	21
140	12.	7.	20
141	12.	7.	20
142	11	6.	19
143	11	6.	19
144	11	6.	19
145	11.	6.	18
146	10.	6.	17
147	10.	5	17
148	10	5	17
149	10	5	16
150	9	5	16

SUM

66088

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5205.	2289.	677.	441.	66088
INCHES		3.57	4.21	4.28	4.28
AC-FT		1141.	1344.	1366	1366.

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	2806	718	180	115	1.55
ROUTED TO	0	2809	693	179	115	1.55
HYDROGRAPH AT	2	4850	1616	400	260	3.50
2 COMBINED	22	6602	2307	535	375	5.05
ROUTED TO	222	5378	2157	532	374	5.05
HYDROGRAPH AT	3	876	213	53	34	0.46
2 COMBINED	30	5673	2344	635	408	5.51
ROUTED TO	333	5216	2255	633	408	5.51
HYDROGRAPH AT	4	1170	222	55	36	0.43
2 COMBINED	44	5311	2420	685	444	5.99
ROUTED TO	444	5205	2289	677	441	5.99